

CHAPTER 3.0 *AFFECTED ENVIRONMENT AND IMPACTS*

The analysis of impacts of the I-15 alternatives described in Chapter 2 examined three categories of impacts, as required by the Council on Environmental Quality (CEQ).

- *Direct impacts* are defined by the CEQ regulations as “effects which are caused by the [proposed] action and occur at the same time and place.” For this project, an example of a direct impact would be taking a wetland for right-of-way for an interchange.
- *Indirect impacts* are defined by the CEQ regulations as “effects which are caused by the [proposed] action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate...” For this project, an example of an indirect impact could be urban development on farmlands or wetlands as a result of new access provided by the project.
- *Cumulative impacts* are defined by the CEQ regulations in 40 Code of Federal Regulations (CFR) 1508.7. The CEQ regulations define cumulative impacts as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.” Cumulative impacts include the direct and indirect impacts of a project together with the reasonably foreseeable future actions of other projects.

Cumulative impacts also include the impacts of “other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions.” For this project, an example of a past action in the I-15 study area is the construction of the Pleasant Grove and I-15 interchange. Examples of reasonably foreseeable future actions include the planned Frank Gehry Point of the Mountain development in Lehi and the planned widening of SR-68 Redwood Road in Northern Utah and southern Salt Lake counties. These reasonably foreseeable future actions are independent of the I-15 project, but must be considered in this Environmental Impact Statement (EIS) as part of the cumulative impacts analysis.

The following sections describe the existing conditions for each resource evaluated in this EIS. For each resource, the existing conditions description is followed by a description of the direct and indirect impacts of Alternatives 1 and 4, and the design options within Alternative 4. Section 3.19 of this chapter presents the cumulative impact analysis of the alternatives on those resources for which an impact has been identified.

Since publication of the DEIS, UDOT has selected a Preferred Alternative that includes Option C in American Fork and Option D in Provo-Orem. Designs for both have been modified slightly since publication of the DEIS, as described in Chapter 2. Throughout the FEIS, all impacts for these two options reflect updated designs, and so may differ from those described in the DEIS.

3.1 Land Use

The land use context of I-15 in both Utah and Salt Lake counties and the impacts of Alternatives 1 and 4 on land use are presented in this section. Since the construction of I-15 in the mid 1960's, the communities and lands in Utah County and southern Salt Lake County have developed around the existing I-15 corridor. A variety of land uses have developed adjacent to I-15, guided by local development controls exercised by cities and counties. Highway commercial land uses are generally associated with all existing I-15 interchanges.

As land use and land use planning have developed around I-15, and the majority of improvements in Alternative 4 are reconstruction and widening of the existing I-15 mainline and interchanges, this analysis is focused on those geographic locations where potential new interchanges and a frontage road system would be located. In the DEIS, four areas were evaluated: the Provo-Orem Options A, B, C and D including the new Orem 800 South interchange in Central Utah County, the American Fork Main Street interchange Options A, B, and C, and the North Lehi Interchange in Northern Utah County.

This evaluation was based on a review of the existing land use, local jurisdiction zoning maps and general plans, and discussion of the potential impacts of the I-15 alternatives with planning staff and other representatives from the Cities of Provo, Orem, American Fork and Lehi.

The existing land uses as depicted in the Utah County assessor parcel database (Utah County, 2007) were used as a baseline. These land use maps and any planned land uses near the I-15 corridor were discussed in meetings with staff from the cities of Provo, Orem and Lehi.

3.1.1 *Affected Environment*

3.1.1.1 Existing Land Uses

The existing land uses for Provo, Orem, American Fork, and Lehi were obtained from the Utah County Assessor's parcel database (Utah County, 2007) and are shown in Figures 3.1-1 through 3.1-4. The database was current as of January 2007.

The Cities of Provo and Orem are in the Central Utah County Section of the I-15 corridor. The existing land uses in Provo adjacent to I-15 are mostly residential on the west side and a mix of residential and commercial on the east side. Some limited government/utility and agriculture uses also exist. In the City of Orem adjacent to I-15 on the west and south sides of the city, the most prevalent existing land use is commercial. East of I-15 and north from 800 South more residential uses exist.

The City of American Fork is in the Northern Utah County section of the I-15 corridor. The existing land uses in the area of the existing Main Street interchange are commercial and low density residential, with agricultural uses to the west of the interchange.

The City of Lehi is in the Northern Utah County section of the I-15 corridor. The existing land uses in Lehi adjacent to I-15 are mostly commercial on the west side and a mix of vacant land and commercial use on the east side. The large residential developments of Traverse Mountain and Thanksgiving Point lie within ¼ to ½ mile of I-15. A large new commercial office park development has been approved directly south of the Thanksgiving Point residential development, but has not yet been built.

3.1.1.2 Land Use Controls - Planning and Zoning

Land use planning in Utah is done at the local level. Utah Code 10-9a, the Municipal Land Use Development and Management Act (1992), empowers cities and towns to enact zoning and the regulation of land use within their boundaries. The County Land Use Development and Management Act (UTC 17- 27a) does the same for county jurisdictions. These two acts are commonly referred to as local "enabling" acts and form the controlling law for zoning in Utah. The enabling acts allow local jurisdictions to prepare and adopt a zoning ordinance through their law-

making powers. Frequently, the zoning ordinance consists of the text and a zoning map illustrating land use classifications within the jurisdiction. The zoning ordinance describes land uses that are allowed within each of the land use classifications, or “zones,” defined by the ordinance.

The Cities of Provo, Orem, American Fork, and Lehi have zoning ordinances and zoning maps that guide development within their cities. These are shown in Figures 3.1-5 through 3.1-8. Each of these cities also adopted general plans and general plan maps. These are shown in Figures 3.1-9 through 3.1-12.

3.1.1.3 Local Transportation Plans

The Provo Transportation Master Plan identifies needed state-funded long-range transportation improvement projects. These include reconstruction of the Center Street interchange and reconstruction of the I-15 structure over 820 North.

The Cities of Orem and Lehi also have transportation plans that identify specific proposed new I-15 interchange locations. The City of Orem’s “Southwest Area Transportation Study (SWATS) Final Report” identified the need for a new interchange at Orem 800 South to alleviate the poor levels of service and congestion in that area of the city (Horrocks, 2003). The City of Orem Master Plan was adopted in the Summer of 2007 (Goodrich, 2008). The City of American Fork’s General Plan, Transportation Element (Horrocks, 2004) identifies the continuation of Main Street to the west of the I-15 interchange as a major arterial on the same alignment as the existing Main Street. The City of Lehi’s Master Transportation Plan (MTP) (Lehi, 2004) identifies two sites for new interchanges with I-15. One located at 300 West and another located north of SR-92, west of the Traverse Mountain development.

3.1.2 *Land Use Impacts of Project Alternatives*

The impacts of Alternative 1 and 4 on existing land use, zoning, and general plans were assessed through discussions with planning staff from each of the Cities of Provo, Orem, American Fork, and Lehi. Planning staff and other representatives from these four cities provided input as to the potential impacts of Alternative 4 on land use, zoning and general plan provisions of their respective cities. The following evaluation is based on their input and a review of their adopted land use, general plans, and zoning. Direct impacts to specific properties are described in Section 3.4 Relocations.

3.1.2.1 Alternative 1: No Build

Alternative 1 would not impact land use, zoning or general plans as no changes would be made to I-15. As Alternative 1 only contains I-15 rehabilitation and maintenance, it would not be consistent with the City of Orem’s SWATS Final Report, the American Fork Transportation Element of their General Plan, nor the City of Lehi’s Master Transportation Plan.

3.1.2.2 Alternative 4: I-15 Widening and Reconstruction

Through discussions with City Planning Department staff and other representatives from Provo, Orem, American Fork, and Lehi, the I-15 team confirmed that the existing land use maps shown in Figures 3.1-1 through 3.1-4 accurately depict existing conditions and changes that have occurred or have been approved since January 2007. Additionally the general plan and zoning maps for each city were reviewed with the staff members of each city¹. The I-15 project team also consulted with the City of American Fork staff. American Fork provided a resolution regarding I-15 (Knobloch, 2007).²

In most sections of the I-15 Corridor, the existing general plans, land use planning, and zoning are not anticipated to change with the reconstruction of I-15 under Alternative 4. These planning documents were developed based upon the existing I-15 corridor, and planned improvements to the corridor. Although Alternative 4 would reconstruct

¹ Meetings were held July 18, 2007 with Kim Struthers, City of Lehi Planning Department; Connie Douglas and Paul Goodrich, City of Orem Planning Department; and Brent Wilde, City of Provo Planning Department.

² Personal communication with Wendelin Knobloch, City of American Fork Planning Department, November 2, 2007.

existing interchanges and have a wider footprint, the land use plans, zoning, and general plans are not expected to change because of the reconstruction.

There are three areas where substantive changes in I-15 access would occur with Alternative 4: 1) the Provo/Orem area (Options A, B, C and D), 2) the proposed new Orem 800 South interchange, and 3) the new North Lehi interchange. These changes may impact land use and planning. In addition, the three design options for the American Fork Main Street Interchange may have differing impacts on land use and planning.

Provo/Orem Area

The planning staff from the cities of Provo and Orem indicated that the zoning identified in the City of Provo and the City of Orem Zoning maps, illustrated in Figures 3.1-5 and 3.1-6, respectively, and the uses identified in the City of Provo, and the City of Orem General Plans, illustrated in Figures 3.1-9 and 3.1-10, respectively, will not be changed by the construction of any of the Alternative 4 Options. The City of Provo passed Resolution 2007-65 in July 2007 supporting a frontage road system with limited access and reconstruction of the Provo Center Street interchange to a SPUI. The City of Orem City Council passed Resolution R-07-0025 on June 26, 2007 that is in support of Option A; this option includes frontage roads. A copy of these resolutions can be found in Appendix A.

Alternative 4 is consistent with the two interchange and overpass reconstruction projects contained in the Provo Transportation Master Plan. That plan did not address frontage roads. As discussed below, the proposed Orem 800 South interchange in Options A and C is consistent with the City of Orem's Southwest Area Transportation Study; it identified the need for an interchange at this location.

Orem 800 South Interchange

Options A and C include a new diamond interchange at Orem 800 South. This interchange would include new on-ramps and off-ramps adjacent to the freeway. On the western side of the freeway the proposed interchange would connect to Geneva Road. On the eastern side, a new approach to the diamond interchange under Options A and C would be constructed approximately 600 feet north of the centerline of the existing Orem 800 South roadway. The 800 South interchange would result in encroachment onto existing residential development, land owned by Utah Valley State College (UVSC) and commercial zoned land on both sides of the freeway.

The primary impact would occur to the east of I-15. The new interchange could be an impetus for minor change in the land use adjacent to and in close proximity to the interchange because of increased interstate access.

The City of Orem General Plan identifies future land uses near this interchange as primarily commercial, with some residential use proposed to the northeast. A small area of land currently zoned, or planned, for future residential and commercial uses would be converted to roadway use as a result of this project.

City of Orem planning staff indicated that the land use designations and zoning identified in the City of Orem zoning and General Plan maps, in Figures 3.1-6 and 3.1-10 respectively, will not be changed by Alternative 4.

American Fork Main Street Interchange

The planned land use is defined in the City of American Fork's General Plan as Commercial, with Low Density Residential to the southwest, and Agriculture further to the west. These land use designations are shown in Figure 3.1-11.

Option A Diamond and Option C North SPUI would provide continued access to existing land uses and planned commercial, residential and agricultural uses in the vicinity of the interchange. These two options are not expected to change the land use designations in the General Plan. Options A and C would generally be consistent with the Transportation Element of the City of American Fork's General Plan. The City of American Fork passed a resolution (Resolution No. 07-01-02R, included in Appendix A and D of this FEIS), which states that Option C is preferred by the City (January 2008).

Option B South SPUI would be incompatible with the General Plan and would likely result in changes in land use designations. Resolution 07-01-02R states that Option B “would render a significant portion of land area now being developed for commercial purposes largely inaccessible, would be harmful to the establishment of a viable residential environment in the western portion of the City, and destroy the viability of the existing business district.”

North Lehi Interchange

The Lehi Master Transportation Plan identifies a possible new interchange at the location proposed by Alternative 4. The City of Lehi planning staff indicated that increased interstate access due to the new SPUI interchange is not likely to be an impetus for major change in the land use adjacent and in close proximity to the interchange. The interchange may, however, affect the pace of projected growth and influence the nature of development in this area. The existing land uses and both approved and preliminary planned development are ongoing and will only be influenced by better access and reduction of congestion provided by Alternative 4. An example of a recently approved development is the Office Park approved July 2007, illustrated in Figure 3.1-4. A preliminary planned project example is the Gehry project on the east side of I-15 north of the residential development, Traverse Mountain. Lehi planning staff confirmed that the uses identified in the City of Lehi Zoning map in Figure 3.1-8 and the City of Lehi General Plan Land Use Element, illustrated in Figure 3.1-12, would not be changed by the construction of Alternative 4.

The North Lehi interchange in Alternative 4 is compatible with the Lehi Master Transportation Plan in that it is generally synonymous with the Traverse Mountain interchange referred to in their plan.

Impacts on Growth

According to MAG's long-range plan, Utah County's population grew by 66% during the 1990's, which was twice the growth rate of the rest of the Wasatch Front. In contrast, since 1990 the capacity of the state road system in Utah County has increased by 1%. With a projected 83% growth in population over the next 30 years, the majority of growth will occur in the northern and western parts of Utah County with some growth in the southern part of the county.

The growth of suburbs throughout the past 30 years reflects a trend in land use resulting in a low-density development pattern in Utah County. The current land-use plans suggest this pattern will continue.

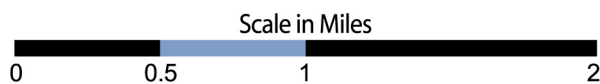
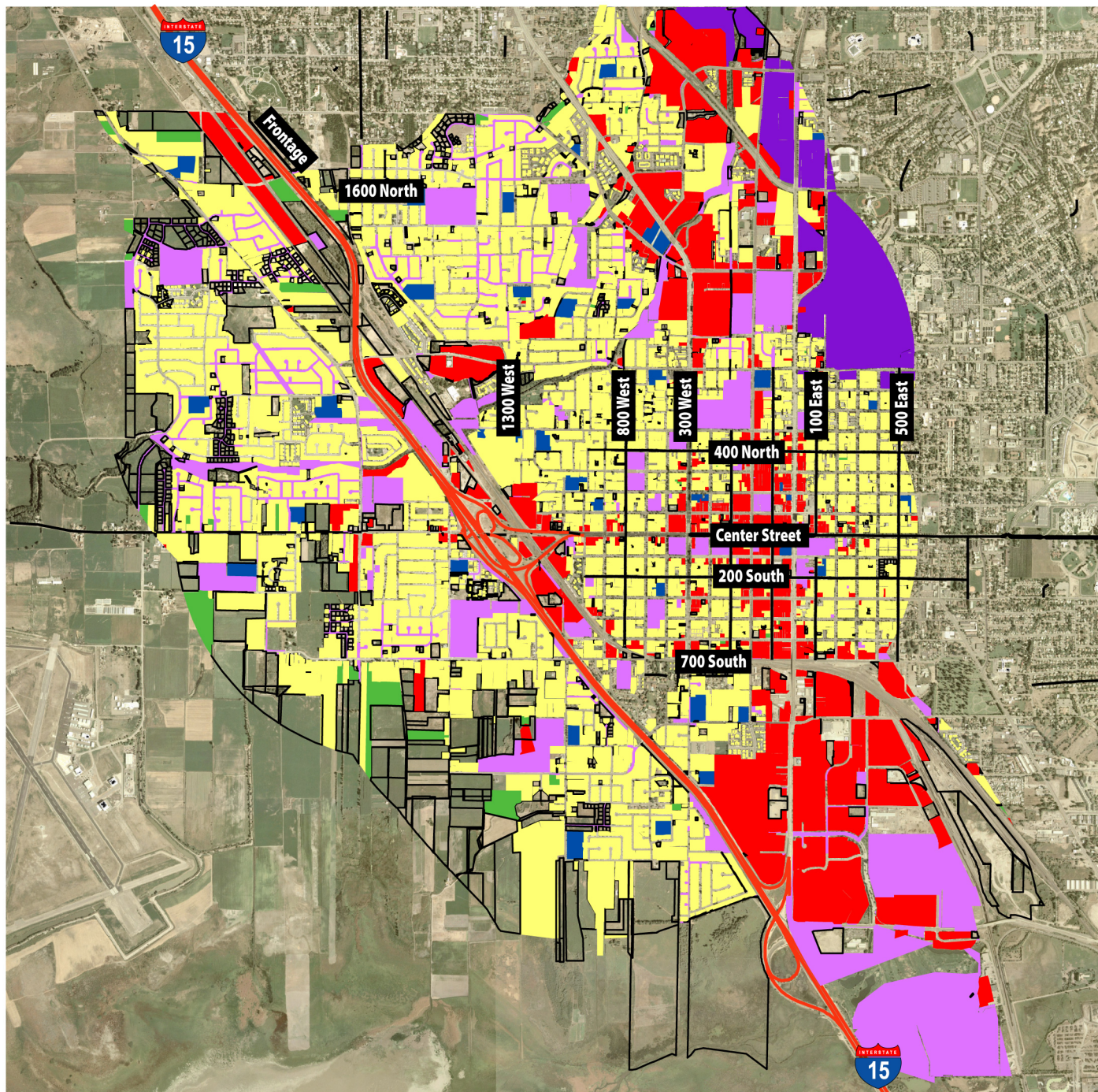
Given the past and predicted growth in Utah County, and the very small increase in roadway capacity relative to that growth, Alternative 4 would generally serve to accommodate previous growth and travel demand, and facilitate the continuation of the general plans developed by local jurisdictions. Alternative 4 would therefore not induce additional growth but would accommodate growth that has already occurred, in addition to that which is planned.

Indirect Impacts

The implementation of frontage roads through the Provo/Orem Options A or B may result in pressure to develop existing residential and other lands to commercial uses. Implementation of Option B South SPUI at the American Fork Main Street interchange would likely result in pressure to redevelop existing agricultural and low density residential lands west of the interchange to commercial uses.

3.1.3 Mitigation

Since no adverse impacts to land use were identified, no mitigation is proposed.



LEGEND:

■ Agriculture	■ University
■ Residential	■ Commercial
■ Government, Utilities, Exempt	■ Religious
■ Vacant	

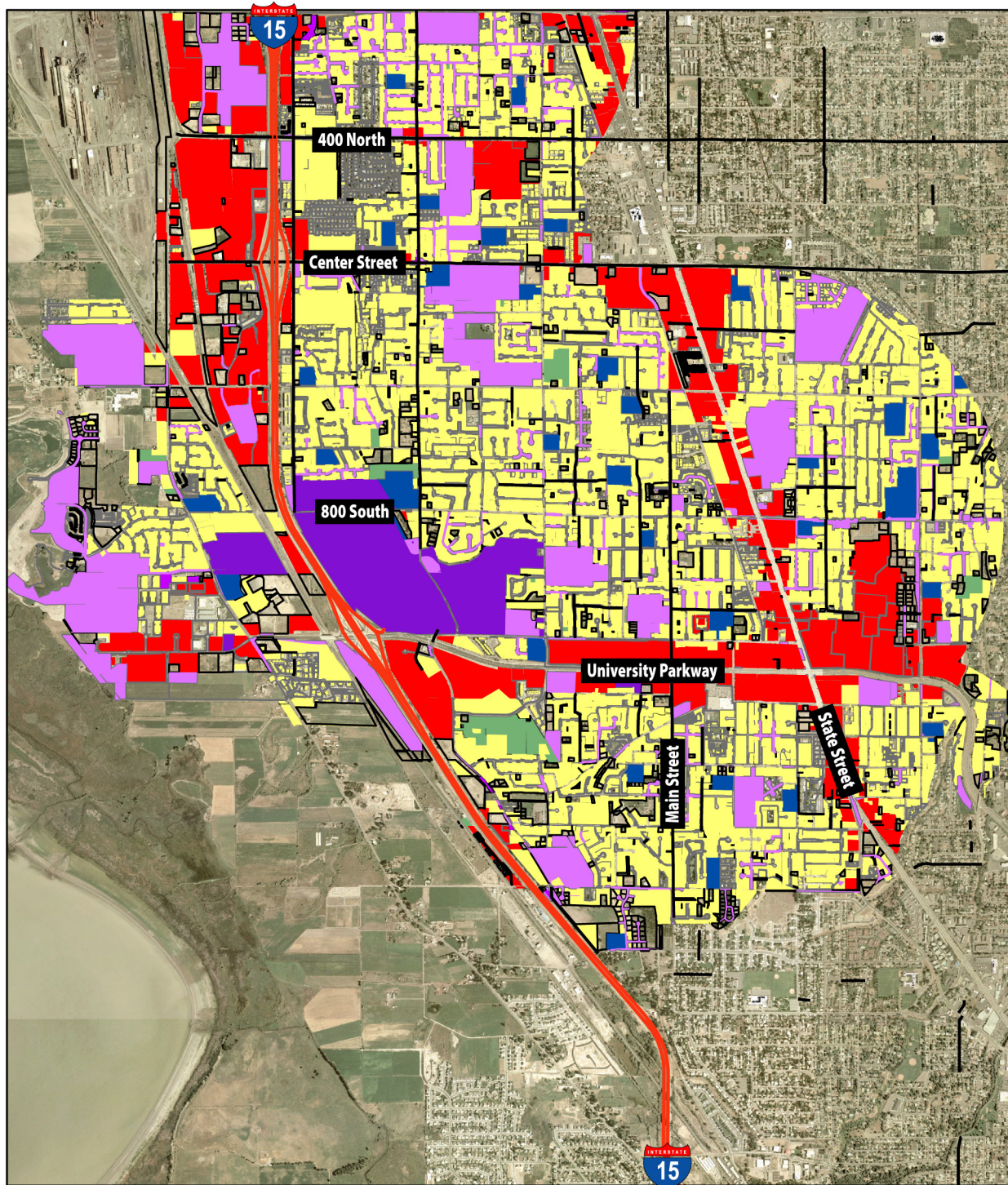
Sources:

1. Utah County GIS; URL: <http://ims2.co.utah.ut.us/website/download1/data.cfm>
2. Personal communication between Brent Wilde, City of Provo, and Lani Eggertsen-Goff, PB; July 2007

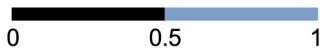
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Figure 3.1-1
Existing Land Use in Provo



Scale in Miles



LEGEND:

- | | |
|--|---|
| ■ Agriculture | ■ University |
| ■ Vacant | ■ Commercial |
| ■ Government, Utilities, Exempt | ■ Religious |
| | ■ Residential |

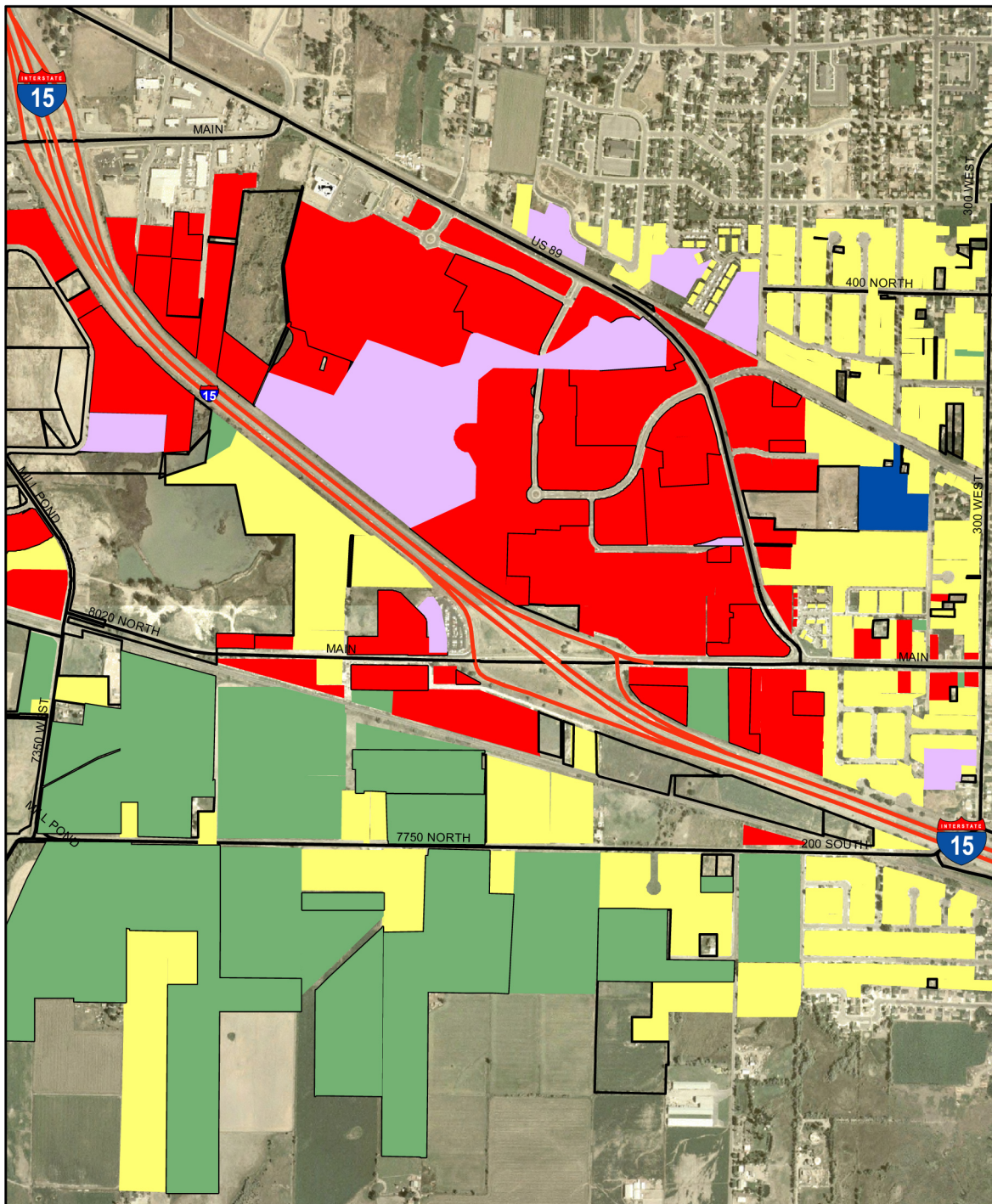
Sources:

1. Utah County GIS; URL: <http://ims2.co.utah.ut.us/website/download1/data.cfm>
2. Personal communication between Paul Goodrich & Connie Douglas, City of Orem, and Lani Eggertsen-Goff, PB; July 2007

N



Figure 3.1-2
Existing Land Use in Orem



Scale in Miles

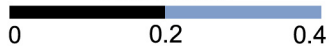


Figure 3.1-3

Existing Land Use in American Fork

LEGEND:

- Agriculture
- Vacant
- Government

- Commercial
- Religious
- Residential

Source:

Utah County GIS; URL: <http://ims2.co.utah.ut.us/website/download1/data.cfm>

N



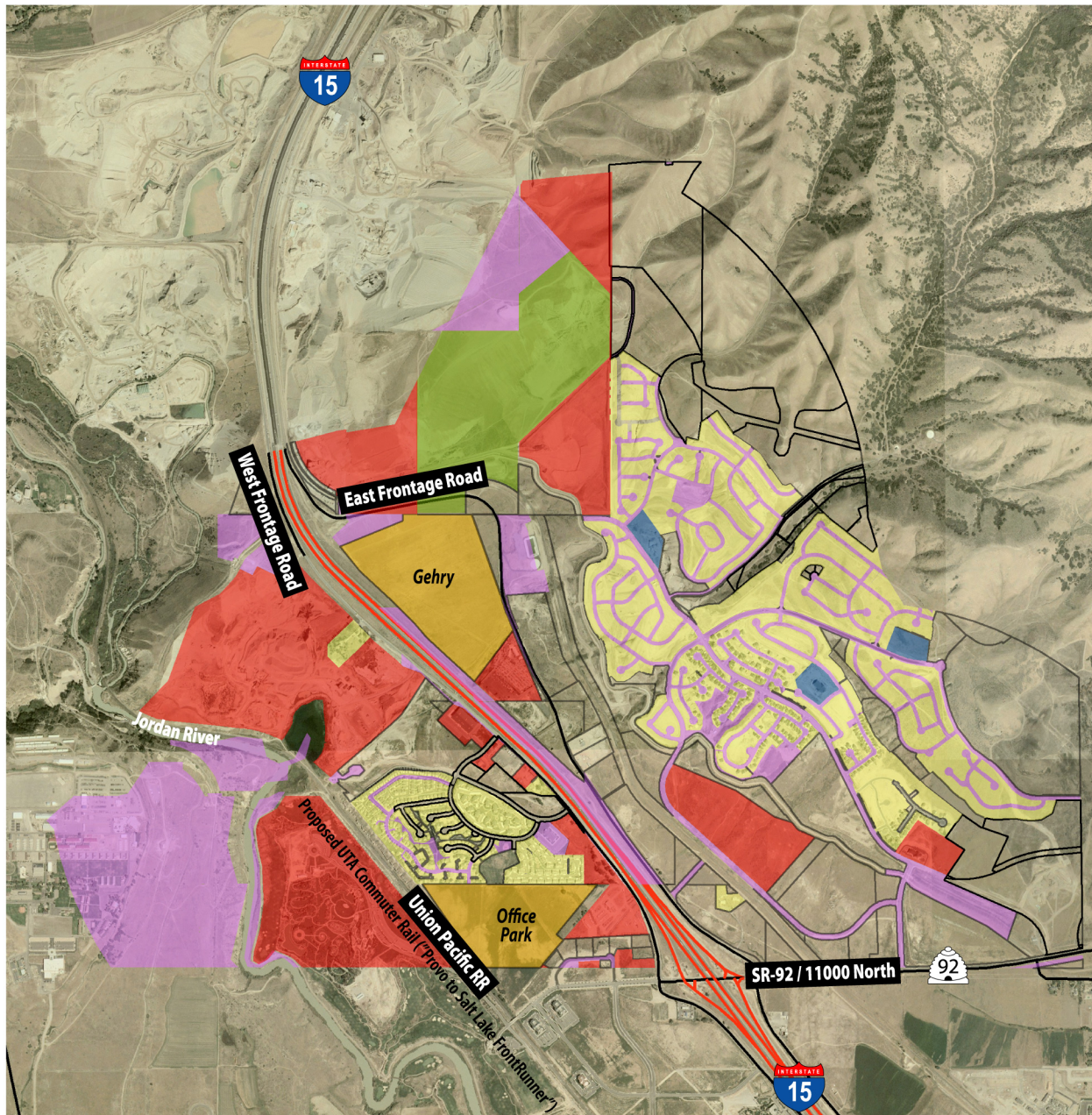


Figure 3.1-4
Existing Land Use in Lehi

Scale in Miles
0 0.25 0.5 1

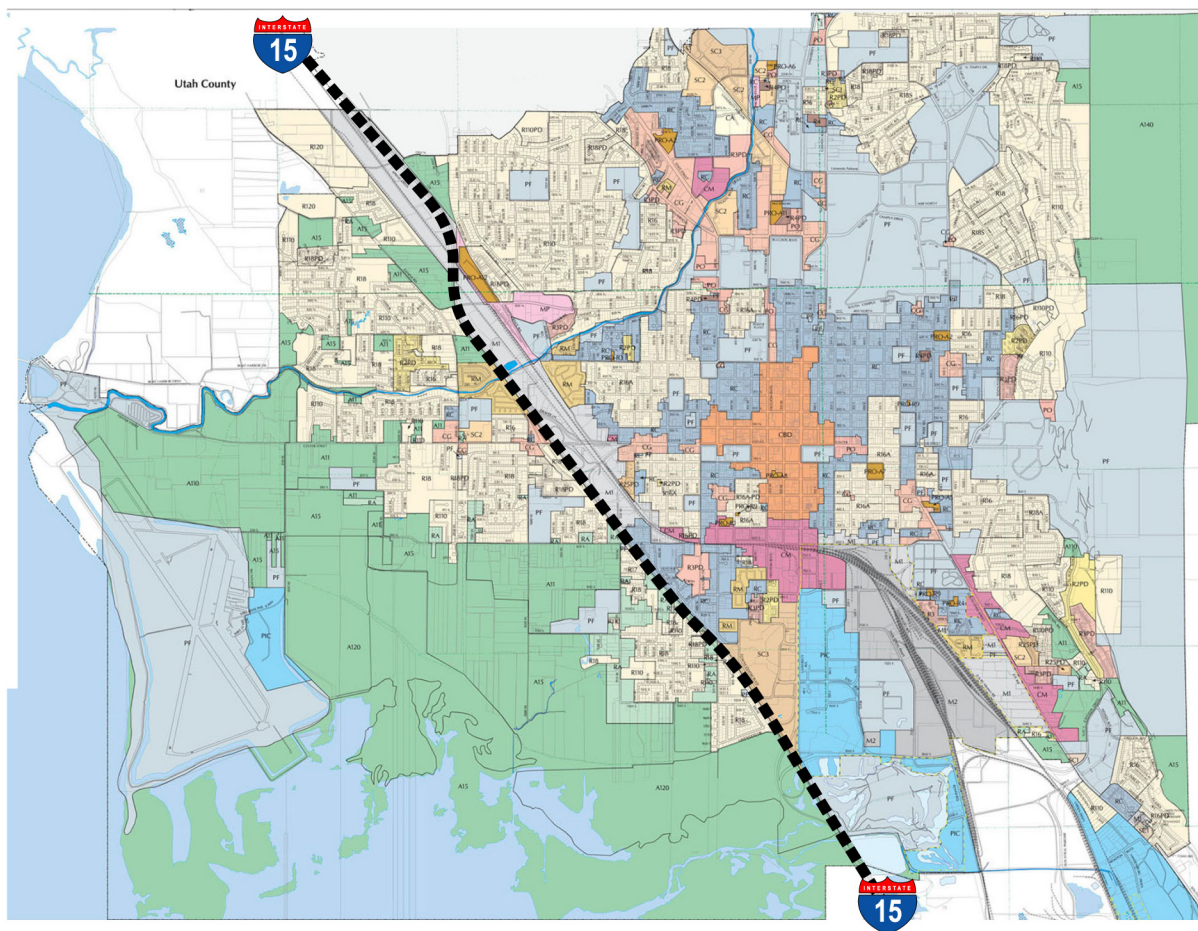
LEGEND:

 Vacant	 Government, Utilities, Exempt
 Commercial	 Residential
 Religious	 Approved not built
	 Recreation

Sources:

1. Utah County GIS; URL: <http://ims2.co.utah.ut.us/website/download1/data.cfm>
2. Personal communication between Kim Struthers, City of Lehi, and Lani Eggertsen-Goff, PB; July 2007





Map Legend

August 16, 2006

A1 Agricultural	M1 Light Manufacturing	R1 One-Family Residential	R5 Very High Multiple Residential	SC2 Community Shopping Center
CA Automotive Center Commercial	M2 Heavy Manufacturing	R2 Two-Family Residential	RA Residential Agricultural	SC3 Regional Shopping Center
CBD Central Business District Commercial	MP Manufacturing Park	R25 (R2.5) Low Multiple Family Residential	RBP (R&BP) Research and Business Park	SDP Specific Development Plan
CG General Commercial	PF Public Facilities	R3 Medium Multiple Residential	RC Residential Conservation	SSC Specialty Support Commercial
CM Heavy Commercial	PIC Planned Industrial Commercial	R4 High Multiple Residential	RM Residential Manuf. Home Park	PRO Project Redevelopment Option
PO Professional Office		SC1 Neighborhood Shopping Center		

SUPPLEMENTAL CODES:
 (PD) - Planned Unit Development
 (S) - Supplementary Residential Overlay
 (A) - Accessory Apartment Overlay
 (-R#) - Residential PRO Zone
 (-A#) - Apartment PRO Zone
 (-B#) - Business PRO Zone

NO SCALE

Figure 3.1-5
Zoning Map of Provo

LEGEND: See Map

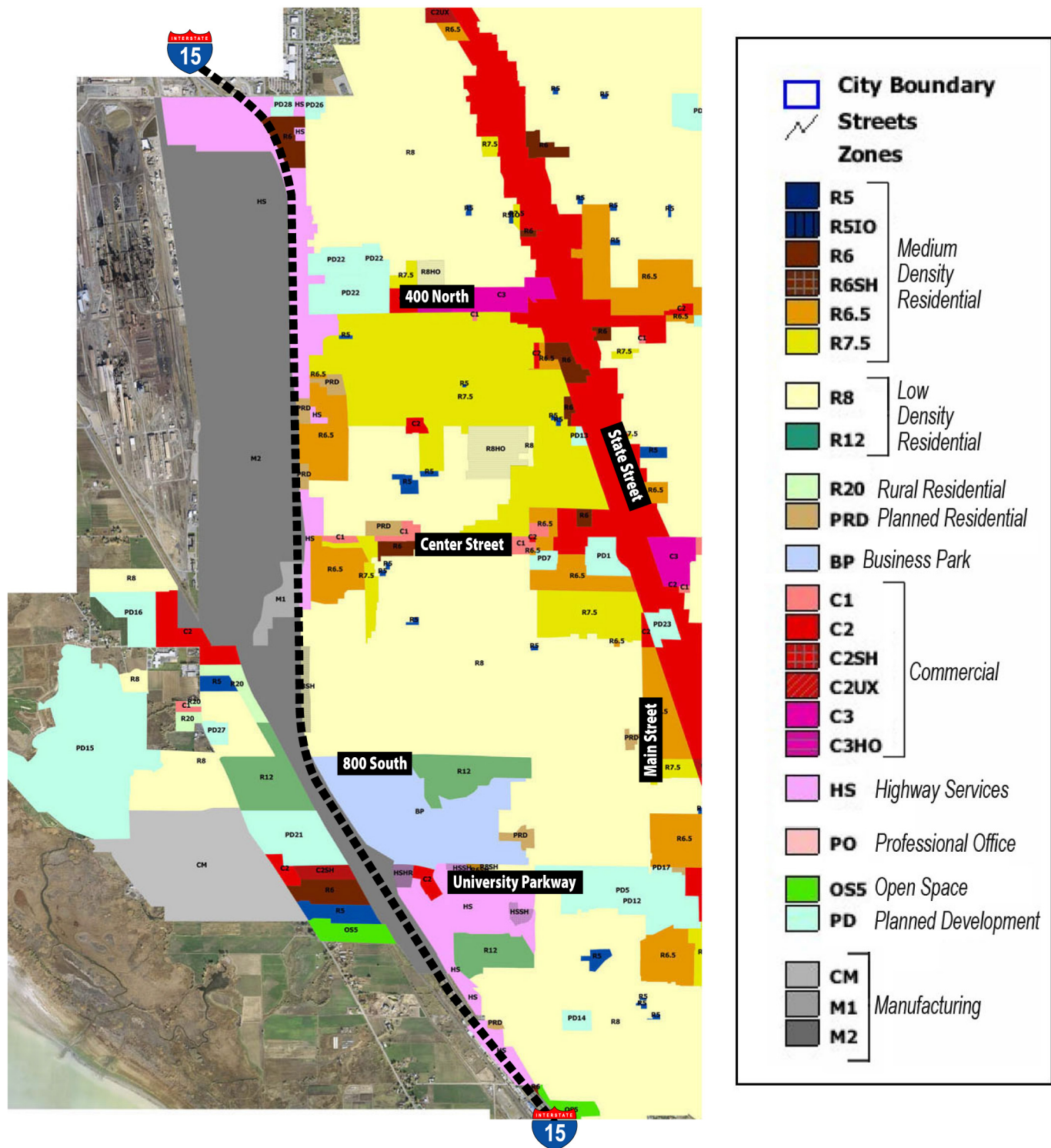
■■■■■ I-15

Source:

Provo City Website, 2007; URL: <http://www.provo.org/comdev.zonemap.html>

N





NO SCALE

Figure 3.1-6
Zoning Map of Orem

LEGEND: See Map

■■■■■ I-15

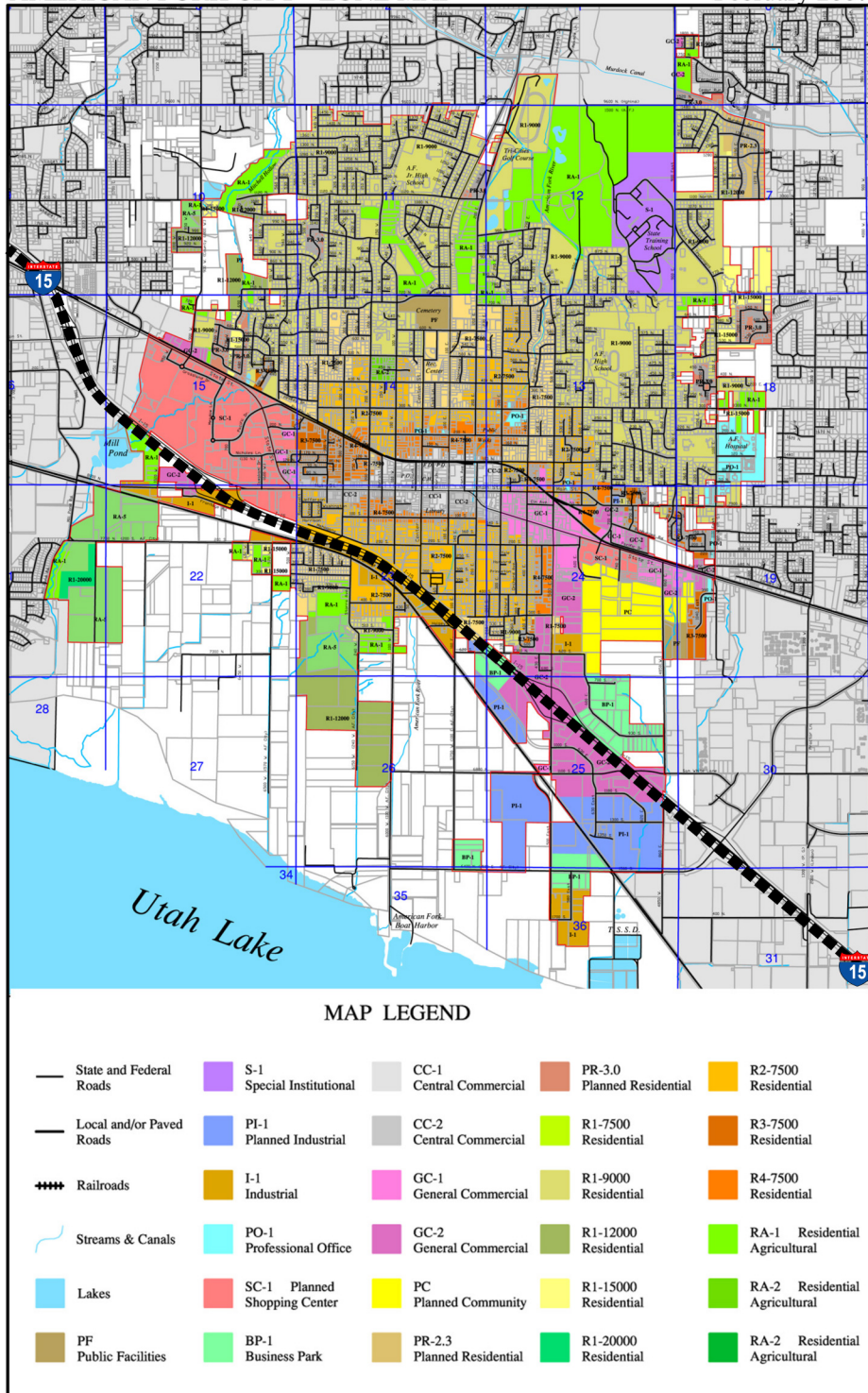
Source:
Orem City, 2007

N



AMERICAN FORK CITY - ZONE MAP

February 2007



NO SCALE

Figure 3.1-7
Zoning Map of American Fork

LEGEND: See Map

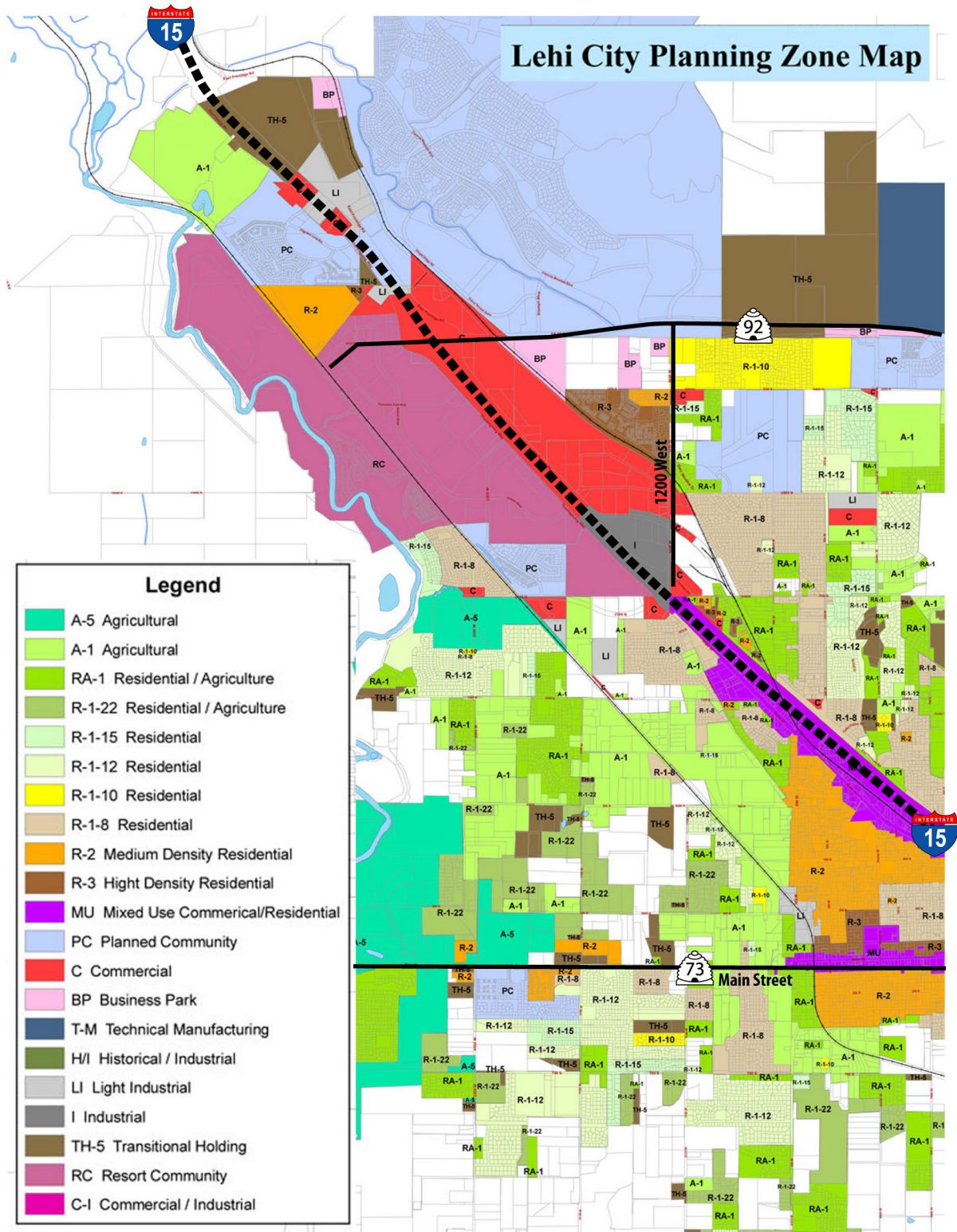
■■■■■ I-15

Source:

American City, 2007 website; URL: http://www.afcity.com/DE_Planning.asp

N





NO SCALE

Figure 3.1-8
Zoning Map of Lehi

LEGEND: See Map

■■■■■ I-15

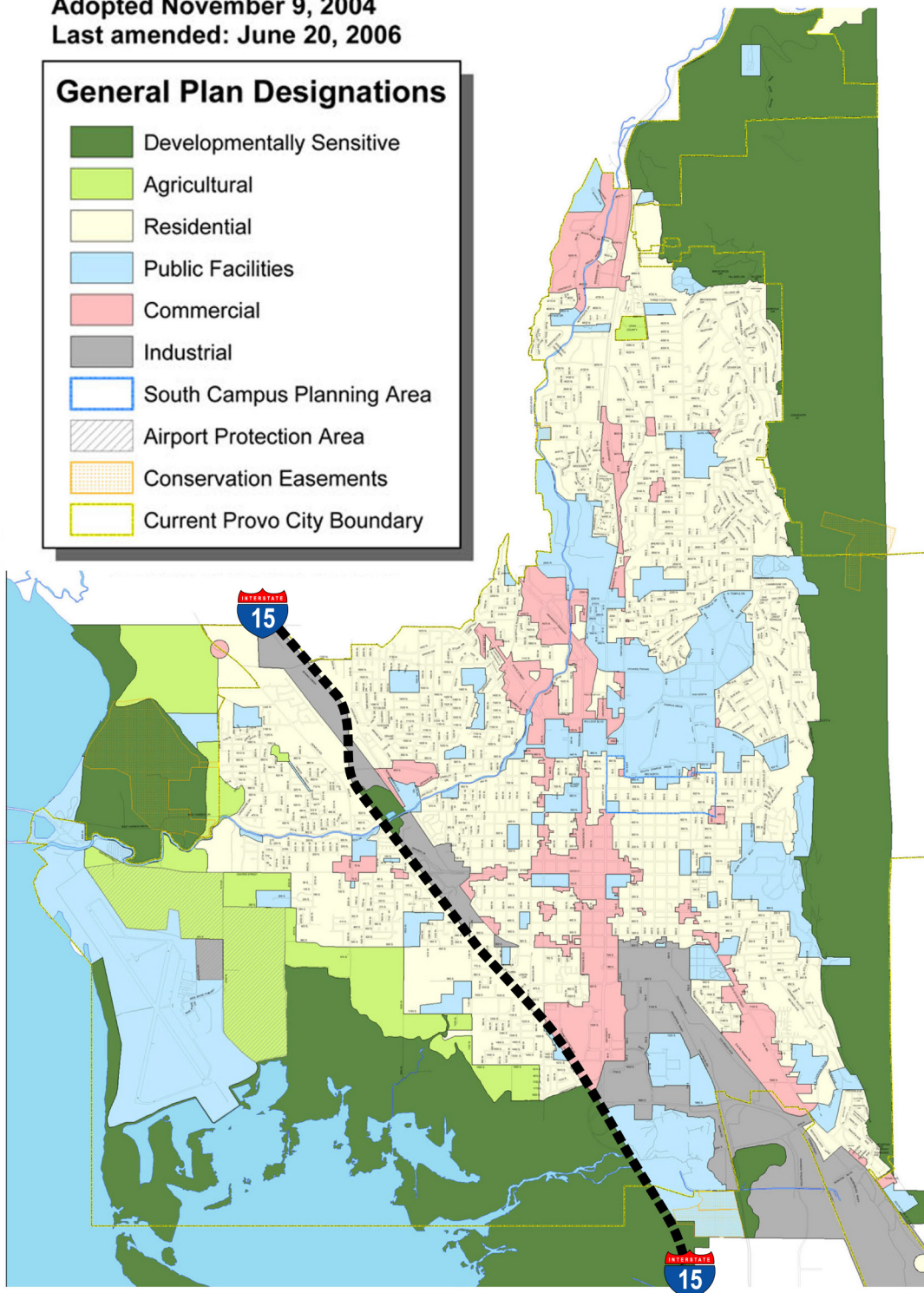
Source:

Lehi City Website, 2007; URL: <http://www.lehicity.com/planning/maps.shp>

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Adopted November 9, 2004
Last amended: June 20, 2006



NO SCALE

Figure 3.1-9
Provo City General Plan

LEGEND: See Map

■■■■■ I-15

Source:
Provo City Website, 2007; URL: http://www.provo.org/comdev.gp_map65.html

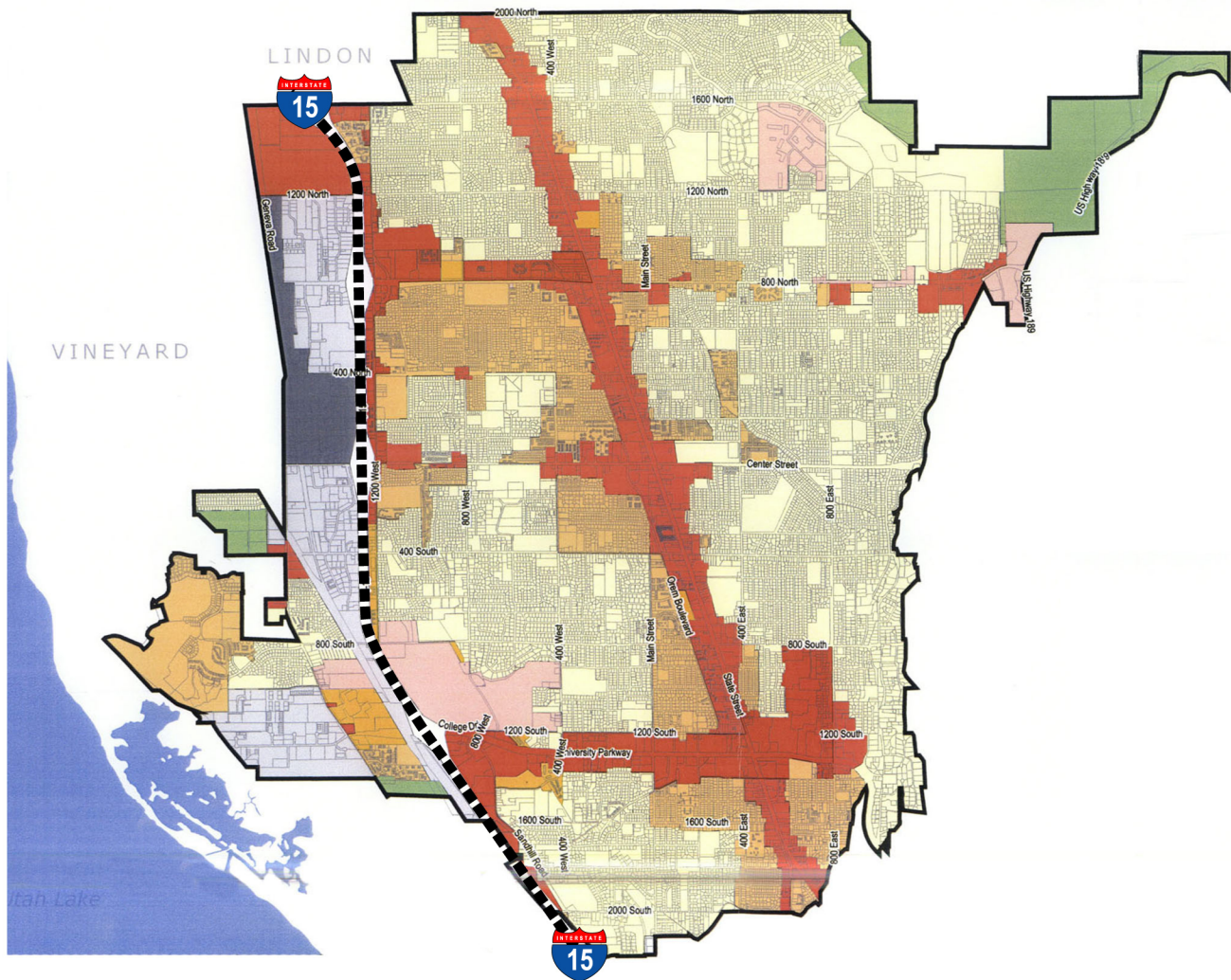


CITY OF OREM GENERAL PLAN LAND USE DESIGNATIONS

Approved February 27, 2007

Orem General Plan

- Community Commercial
- High Density Residential
- Industrial
- Low Density Residential
- Light Industrial
- Medium Density Residential
- Professional Services
- Regional Commercial
- Rural Density Residential



NO SCALE

LEGEND: See Map

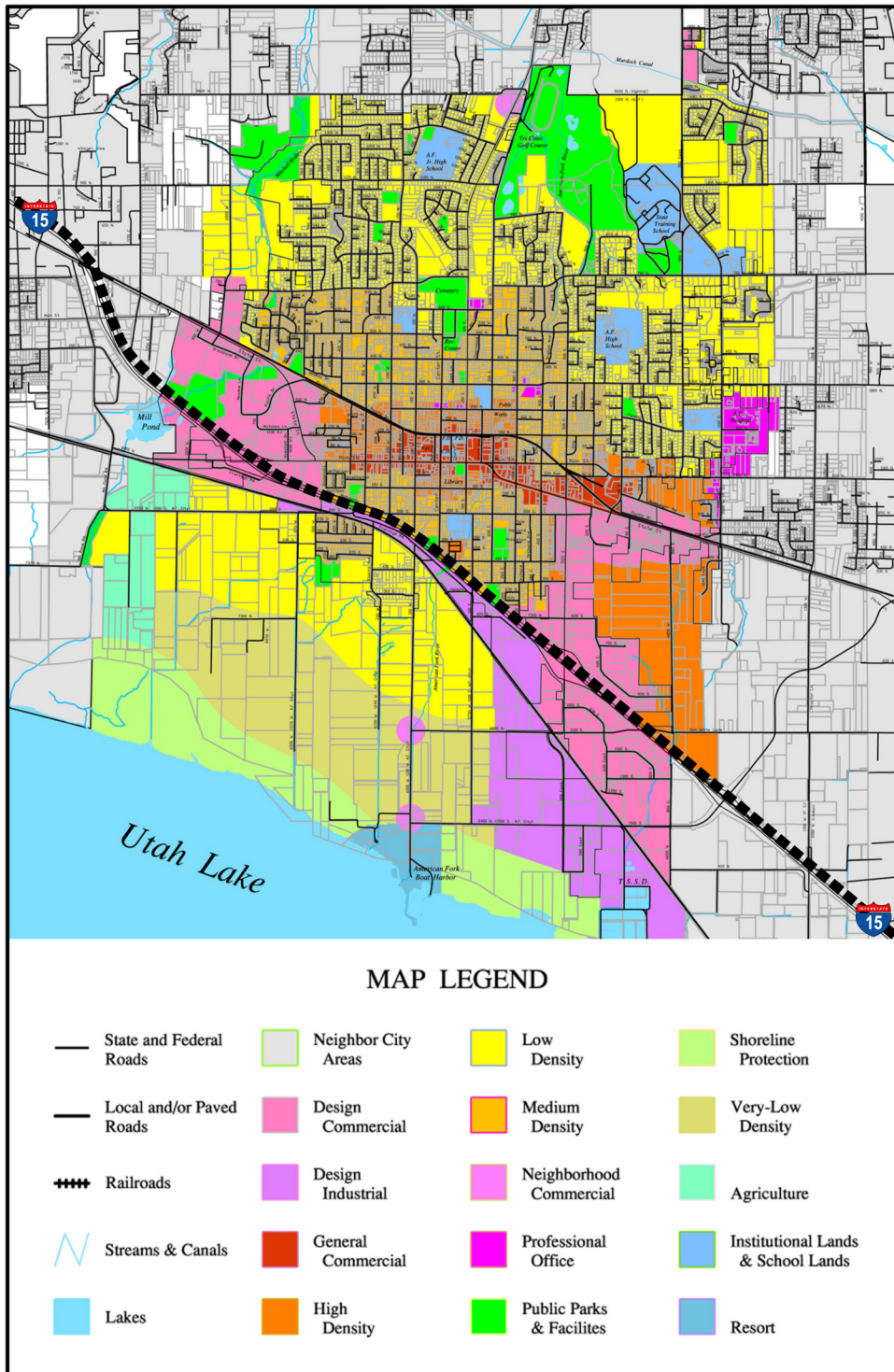
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Source:
Orem City, 2007



Figure 3.1-10
Orem General Plan

AMERICAN FORK CITY - LAND USE PLAN



NO SCALE

Figure 3.1-11

American Fork City General Plan

LEGEND: See Map

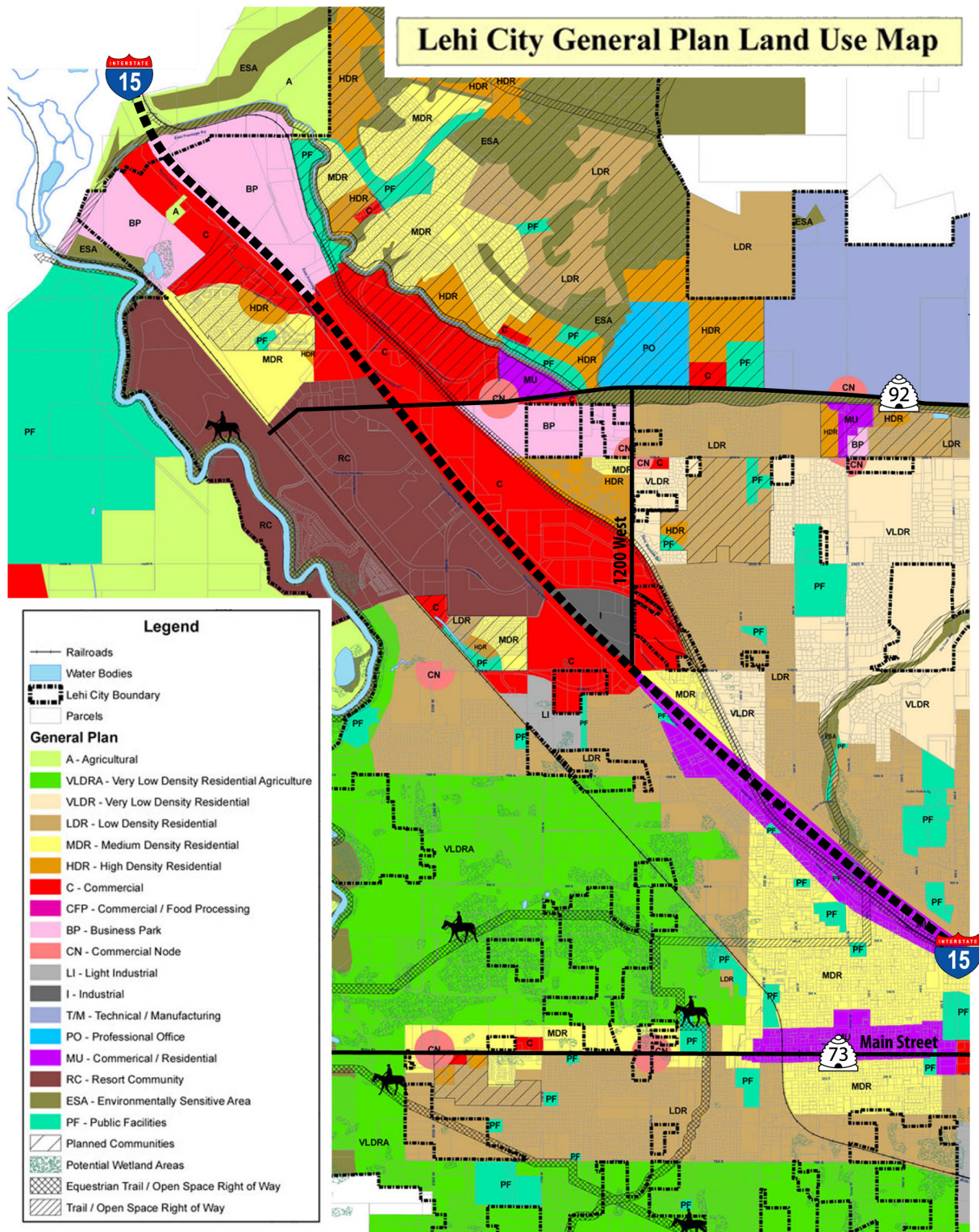
■■■■■ I-15

Source:

American Fork City Website, 2007; URL: http://www.afcity.com/DE_Planning.asp

N





NO SCALE

Figure 3.1-12
Lehi City General Plan

LEGEND: See Map

■■■■■ I-15

Source:

Lehi City Website, 2007; URL: <http://www.lehicity.com/planning/maps.shp>

N



3.2 Social, Demographics and Community Cohesion

This section addresses the existing social, demographic, and community structure of the I-15 corridor and the impacts of I-15 alternatives on these characteristics and community facilities. The social and demographics analysis is based on data obtained from the U.S. Census Bureau (2000 data set), U.S. Bureau of Labor and Statistics, Utah Governor's Office of Planning and Budget (GOPB), and Utah and Salt Lake counties, web based map resources and field visits.

3.2.1 *Affected Environment*

This section discusses demographic characteristics including population, households, age, disability status, transit dependency, and community cohesion.

The information provided in this section reflects the most recent data available, including data from the 2000 U.S. Census for population, households, age, disability status, and transit dependency (US Census, 2000). Population estimates from the Census Bureau's 2005 American Community Survey (ACS) provide data at the county level and is used to illustrate population trends over time. Unlike the 2000 Census, population numbers from the 2005 ACS do not include institutionalized populations (dormitories, prisons, etc).

3.2.1.1 Demographics

Population and Households

As of 2005, the combined population of Utah and Salt Lake counties was 1,424,725, representing 56 percent of the population of the State of Utah (GOPB, 2005).

Population in the two counties has grown substantially over the past fifteen years, as shown in Table 3.2-1. The majority of that growth was in Utah County, where population increased 72 percent since 1990 from 263,590 to 453,977 in 2005. Growth in Salt Lake County increased 34 percent since 1990, from 725,956 to 970,748 in 2005.

The total households in Utah and Salt Lake counties were 464,941 in 2005 (ACS, 2005). The U.S. Census reported that 83 percent of households in the project corridor were comprised of two or more people.

The GOPB has developed population projections for districts and counties in Utah. Table 3.2-1 shows projected population growth and Figure 3.2-1 shows the number of households and total population from 2000 through the predicted population in 2030.

Table 3.2-1: Historical and Projected Population Growth

	1990	2005	2015	2020	2030	Average Annual Rate of Change 2005 - 2030
State of Utah	1,722,850	2,528,926	2,833,337	3,486,218	4,086,319	1.8%
Salt Lake County	725,956	970,748	1,053,258	1,230,817	1,381,519	1.2%
Utah County	263,590	453,977	527,502	661,319	804,112	2.3%

Source: (Census 1990 and GOPB, 2005)

Number of Households and Total Population, 2000-2030 Utah and Salt Lake Counties

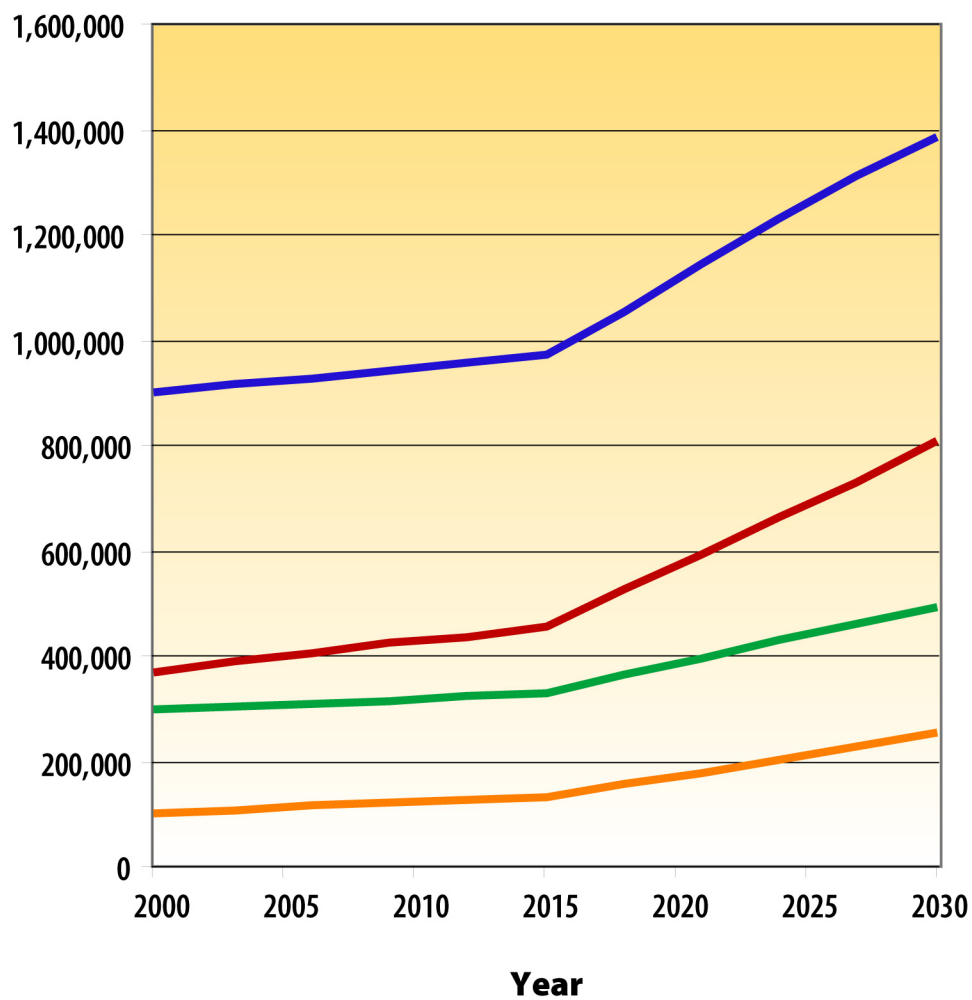


Figure 3.2-1
Household and Population Growth, 2000 to 2030

LEGEND:

- Salt Lake County Households
- Utah County Households
- Salt Lake County Total Population
- Utah County Total Population

Source: Governor's Office of Planning and Budget

Age

According to the 2000 U.S. Census, 60 percent of the population in Utah and Salt Lake counties was between the ages of 18 and 64. In 2005, this portion of the population grew to over 80 percent of the total population (ACS, 2005). Elderly persons, aged 65 and older, comprised 7.59 percent of the population in the two counties in 2000, and dropped slightly to 7.48 percent in 2005 (ACS, 2005).

Transit Dependency

In the two counties, a large proportion of households have at least one vehicle available for personal use according to the 2000 Census. In Utah County, 3 percent of households reported they did not have a vehicle available for their use. Approximately 6 percent of the residents in Salt Lake County had no private vehicles, and were reliant on public transit for most of their transportation needs.

3.2.1.2 Community Facilities and Community Cohesion

Community cohesion is the degree to which residents have a sense of belonging to their neighborhood or community, including commitment to the community, strong attachment to institutions and use of community facilities. Cohesion can be greatly affected by the physical layout of the community and the transportation network.

The I-15 corridor passes through and provides access to several incorporated cities and unincorporated sections of Utah and Salt Lake counties. I-15 was built in the 1960s and many of the towns and communities in the area were incorporated in the 19th and early 20th centuries and existed well before the freeway was constructed. Over the years, travel between communities in Utah and Salt Lake counties has been facilitated by the freeway such that it has helped provide a primary connection between the communities it serves. In many cases, communities have developed around the interstate and community facilities were located in part to take advantage of the connectivity that I-15 provides between communities.

Schools and Libraries

Schools are important public facilities that serve as learning centers and focal points for community activities that contribute to both neighborhoods and community cohesion. Several schools have been identified along the project corridor. Most of these are public elementary, middle and/or high schools. In addition to school facilities, two library services are also located near I-15 in the project area. Table 3.2-2 lists schools and libraries in the project area.

Brigham Young University (BYU) and Utah Valley State College formerly UVSC, are located within the City of Provo and the City of Orem respectively. UVSC abuts I-15 and BYU is located more than one-half mile from I-15.

Table 3.2-2: Schools and Libraries

Name	Location	Address
<i>Schools</i>		
Payson Middle School	Payson	851 W. 450 S.
Wilson Elementary School	Payson	590 W. 500 S.
Taylor Elementary School	Payson	92 S. 500 W.
Starbright Pre School	Payson	174 N. 200 W.
Barnett Elementary School	Payson	456 N. 300 E.
Brockbank Elementary School	Spanish Fork	340 W. 500 N.
Spanish Fork High School	Spanish Fork	99 N. 300 W.
American Heritage School	Spanish Fork	185 E. 400 N.
Westridge Elementary School	Provo	1720 W. 1460 N.
Provo College	Provo	1450 W. 820 N.
Independence High School	Provo	636 Independence Avenue
Franklin Elementary School	Provo	350 S. 600 W.
Utah Valley State College	Orem	800 W University Parkway
Bonneville Elementary School	Orem	1245 N. 800 W.
East Shore High School	Orem	1551 W. 1000 S.
Vineyard Elementary School	Orem	620 E. Holdaway Rd.
Greenwood Elementary School	American Fork	50 E. 200 S.
Lehi Elementary School	Lehi	765 N. Center St.
Sego Lily Elementary School	Lehi	550 E. 900 N.
Meadow Elementary School	Lehi	176 S. 500 W.
Lehi Senior High School	Lehi	180 N. 500 E.
Lehi Junior High	Lehi	700 Cedar Hollow Rd.
Skaggs Catholic High School	Draper	300 E. 11800 S.
<i>Libraries</i>		
Payson Public Library	Payson	66 S. Main St.
City of American Fork Library	American Fork	64 S. 100 E.
Lehi Public Library	Lehi	120 N. Center St.

Sources: Google Maps, 2007f, Nebo School District, 2007, Provo School District, 2007, Alpine School District, 2007, UVSC 2007, Skaggs Catholic School, 2007, Starbright Preschool, 2007, American Heritage School, 2007.

Religious Institutions

Churches provide places of worship and function as valuable meeting and social gathering locations. Numerous church and religious institutions are located in the jurisdictions along the project corridor. Churches within one-half mile of the project corridor are listed in Table 3.2-3.

Table 3.2-3: Religious Institutions

Name	Location	Address
LDS Church	Spanish Fork	360 N. 650 W.
LDS Church	Spanish Fork	505 E. 900 N.
LDS Church	Spanish Fork	99 N. 920 W
LDS Church	Spanish Fork	585 N. Main Street
Provo Bible Church	Provo	131 N. 1600 W.
Rock Canyon Assembly of God	Provo	1200 Towne Center Blvd.
LDS Church	Provo	888 S. Freedom Blvd.
LDS Church	Provo	131 S. 1600 W.
LDS Church	Provo	1700 N. Geneva Rd.
LDS Church	Provo	1066 W. 200 N.
LDS Church	Provo	1402 S. 570 W.
LDS Church	Provo	424 W. 1200 S.
LDS Church	Provo	1090 W. 1020 S.
LDS Church	Provo	610 W. 300 S
LDS Church	Provo	1850 W. 1600 N.
LDS Church	Provo	2225 W. 620 N.
LDS Church	Provo	1122 Grand Ave.
Calvary Chapel of Utah Valley	Orem	1228 W. 1200 N.
Victory Baptist Church	Orem	300 S. 1200 W.
LDS Church	Orem	1105 W. 600 S.
LDS Church	Orem	800 S. Geneva Rd.
LDS Church	Orem	1160 W. 400 S.
LDS Church	Orem	891 W. 130 N.
LDS Church	Orem	1075 W. 1100 N.
LDS Church	Orem	1546 N. 1100 W.
LDS Church	Lindon	610 W. 100 S.
Light House Baptist Church	American Fork	712 S. Utah Valley Dr.
LDS Church	American Fork	381 S. 300 E.
LDS Church	American Fork	165 N. 350 W.
LDS Church	Lehi	481 E. 300 N.
LDS Church	Lehi	1364 W. 1870 N.
LDS Church	Lehi	851 N. 1200 E.
LDS Church	Lehi	1149 N. 300W.
LDS Church	Lehi	1364 W. 1870 N.
LDS Church	Lehi	2150 N. Point Meadow Dr.
LDS Church	Lehi	150 E. 1500 N.
LDS Church	Lehi	481 E. 300 N.
LDS Church	Lehi	1920 N. 500 W.
Adventure Foursquare Church	Draper	352 W. 12300 S.
South Mountain Community Church	Draper	12411 S. 265 W.

Sources: Google Maps, 2007c, Church of Jesus Christ of Latterday Saints, 2007.

Parks

Parks are key recreational sites for local communities and provide important amenity and open space values. Many public parks are located along the project corridor. Several park facilities close to I-15 are clustered in the cities of American Fork and Provo. Parks within one-half mile of the project corridor are identified in the Table 3.2-4.

Table 3.2-4: Parks

Name	Location	Address
Hillman Park	Payson	800 W. 800 S.
Spanish Fork Water Park	Spanish Fork	199 N. 300 W.
North Park	Spanish Fork	507 E. 1000 N.
Reserves at East Bay (golf course)	Provo	1860 S. 380 E.
West Park	Provo	1700 W. 100 N.
Sunset View Park	Provo	525 S. 1600 W.
Footprinter's Park	Provo	1150 S. 1350 W.
Fort Utah Park	Provo	200 N. Geneva Road
Powerline Park	Provo	500 W. 1400 S.
West Park	Provo	1700 W. 100 N.
Paul Ream Wilderness Park	Provo	1600 W. 500 N.
West Park	Provo	1700 W. 100 N.
Community Park	Orem	581 West 165 South
Creekside Park	Lindon	100 South 600 West
Rotary Park	American Fork	400 S. 200 E.
Greenwood Park	American Fork	500 S. 200 E.
Lions Park	American Fork	100 S. 300 W.
Bicentennial Park	American Fork	350 S. Center
J.C. Ball Park	American Fork	400 N. 200 W.
Mountain Meadows Park	American Fork	Storrs Avenue and West 330 S.
Wine's Park	Lehi	500 N. Center St.
Veteran's Ballpark	Lehi	850 W. Main St.
Swimming Pool Park	Lehi	451 E. 200 S.
Centennial Park	Lehi	2250 N. 600 W.
Art Dye Ball Park Complex	Lehi	East 1000 N. and North 600 E/
Thanksgiving Point Golf Course	Lehi	3003 Thanksgiving Way
Salt Lake County Hang Gliding Park	Salt Lake County	15400 South Steep Mountain Rd (100 E.)
Smith Fields Park	Draper	200 E. 13400 S.

Source: Google Maps, 2007e

Cemeteries

Cemeteries are important locations for commemorative activities and help provide a sense of history for many cities and towns. In most jurisdictions in the project corridor, cemeteries are found in locations that are distant from the interstate. Only one cemetery is located near the I-15 corridor: Lehi Cemetery, at 1100 North 400 East.

Community Services and Facilities

Community services are provided at public facilities such as community and senior centers. Social service organizations that provide health and welfare services to the local community, as well as cultural and recreational facilities such as museums and stadiums, are also important community facilities that serve local populations and enhance their communities. The services and facilities identified along the corridor listed in Table 3.2-5

Table 3.2-5: Other Community Facilities

Name	Location	Address
Senior Center	Payson	439 W. Utah Ave.
Robbins Care Center	Payson	984 S. 930 W.
Spanish Fork City Senior Center	Spanish Fork	167 W. Center St.
Springville Museum of Art	Springville	126 E. 400 S.
Provo Pioneer Museum	Provo	560 S. 500 W.
Public School-Community Learning Centers	Provo	962 S. 1100 W.
Food Bank, Community Action Services (United Way)	Provo	815 S. Freedom Blvd.
Community Meditation Center	Provo	817 S. Freedom Blvd.
Community Mediation Center	Orem	800 W. University Pkwy.
City of American Fork Senior Center	American Fork	54 E. Main St.
Dinosaur Museum	Lehi	2929 Thanksgiving Way

Source: Google Maps, 2007d

3.2.2 Alternative 1: No Build Impacts

The demographic characteristics of Utah County and Salt Lake County would not be impacted by Alternative 1 as these are a function of regional, statewide, and national trends. Trends in growth and development, and its associated population growth, would continue as estimated by the Governor's Office of Planning and Budget. Without improvements to I-15, however, increasing traffic congestion along I-15 would worsen, as discussed in Chapter 1 Purpose and Need of this EIS. This congestion, including that on the east/west surface streets that cross and interface with I-15, may affect residents' ability to access facilities within their communities and to travel between communities.

No community facilities would be adversely impacted by Alternative 1.

3.2.3 Alternative 4: I-15 Widening and Reconstruction

The demographic characteristics of Utah County and Salt Lake County would not be impacted by Alternative 4 as these are a function of regional, statewide, and national trends. Trends in growth and development, and its associated population growth, would be expected to continue as estimated by the GOPB.

The communities through which I-15 passes and which it serves have generally developed around the existing highway since its construction. Social networks, transportation patterns and other contributors to positive community cohesion have largely been established around the existing highway so the proposed changes to I-15 would have little impact to community cohesion and transportation patterns.

Options A and C in the Provo/Orem area include a new interchange at Orem 800 South. A new interchange would change travel patterns and would generally have positive impacts on existing social networks and community cohesion. With a new access to I-15 at this location, and the new connection to Geneva Road across I-15, travel patterns would change to take advantage of both accesses to I-15 and access across I-15. The increased accessibility across I-15 would enhance community cohesion and access to community facilities and services. It would also facilitate emergency service providers. Options B and D do not include the new interchange, therefore Options B and D will not provide additional connectivity across I-15.

Since the publication of the DEIS, the Joint Lead Agencies have chosen a Preferred Alternative. In the Provo/Orem area, the Preferred Alternative includes Option D, which does not include an Orem 800 South interchange.

Options A, B and C at American Fork Main Street would all maintain the existing community connectivity across I-15.

The construction of a new interchange in North Lehi would have a similar positive impact. As the area served by this new interchange is relatively undeveloped, the new access to and across I-15 would facilitate the enhancement of social networks and community cohesion as the lands on either side of I-15 develop.

Alternative 4 includes provision for pedestrian and bicycle facilities via reconstructed interchanges, new interchanges, and crossings of riparian areas, as described in Section 3.10 of this chapter. This additional connectivity would serve to strengthen community cohesion by facilitating I-15 crossing opportunities for these alternative modes.

The relocations of homes and businesses that would result from Alternative 4, as documented in “Section 3.4 Relocations” of this EIS, are distributed along the 43-mile corridor and are not concentrated in any one community or neighborhood. The relocation of 15 residential units and 36 businesses from the Preferred Alternative is therefore not expected to change the overall social structure of the adjacent communities. The loss of 15 housing units along the I-15 corridor represents a negligible percent of the total 117,000 housing units in Utah County in 2003 (U.S. Census 2003). The businesses have the option of relocation within the local community or at another location that has proximity to I-15. There would be temporary impacts to those individuals and businesses whose homes and businesses would be relocated.

There would be no adverse impacts to parks and recreation facilities.

3.2.3.1 Indirect Impacts

There would be no indirect impacts to Social, Demographics or Community Cohesion.

3.2.4 Mitigation

A maintenance of traffic (MOT) plan, emergency services plan, a proactive public information program and a media relations plan will be developed and implemented to keep travelers and businesses advised.

To improve community cohesion, the final design of each I-15 interchange will provide for east/west pedestrian/bicycle access across I-15. The type of facility will be determined during design and may be a multi-use sidewalk, a sidewalk for pedestrians, and/or on-street lane for bicyclists. Although MPO and local plans do not show I-15 crossings at each I-15 interchange, it is reasonable to provide for a connection across I-15 to facilitate east-west movement and to increase connections between communities. The provision of these connections is consistent with UDOT policy with regard to Context Sensitive Solutions (CSS).

3.3 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations was signed by President Clinton on February 11, 1994. This Executive Order directs federal agencies to take appropriate and necessary steps to identify and address disproportionately high and adverse effects of their projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. The order works in concert with Title VI of the Civil Rights Act of 1964. Together, these provide the legal and procedural framework for ensuring that Federal actions, including transportation projects, do not discriminate on the basis of race, color, or national origin and do not result in disproportionately high and adverse impacts on minority and low-income populations. The three basic principles of environmental justice are (1) ensure public involvement of low-income and minority groups in decision-making; (2) prevent disproportionately high and adverse impacts of decision on low-income and minority groups; and (3) assure low-income and minority groups receive proportionate share of benefits.

Environmental justice populations are defined as persons who belong to one of these groups: Black, Hispanic, Asian, American Indian and Alaskan Native, Native Hawaiian or Other Pacific Islander, or Low-Income. Low income is defined as a household income at, or below, the US Department of Health and Human Services poverty guidelines.

This analysis was conducted pursuant to Title VI of the Civil Rights Act of 1964, Presidential Executive Order 12898 (Environmental Justice) and Presidential Executive Order 13166 (Limited English Proficiency).

Data from the U.S. Census Bureau (2000 data sets), U.S. Department of Housing and Urban Development (HUD), and local planning documents were used to identify minority, low-income, or ethnic populations in the project study area. For the purposes of the environmental justice analysis, this study area is defined as the Census block groups that are immediately adjacent to I-15. These are shown in Figure 3.3-1. The data was compared to the Salt Lake and Utah County demographic data to determine whether there are higher concentrations of minority, low-income, or ethnic populations in the study area than in the counties in general, based on 2000 U.S Census block group data.

3.3.1 Affected Environment

Figure 3.3-1 shows the census block groups used to develop Table 3.3-1. Census block groups that extend south of, and north of, the logical termini of the project were included to provide a broader area of analysis. Table 3.3-2 provides an overview of the ethnicity and low income characteristics of the Census block groups in the I-15 area.

3.3.1.1 Race and Ethnicity

Table 3.3-1 indicates that ethnic diversity within the project corridor is consistent with the rest of Utah County, according to the U.S. Census. A large majority of individuals identified themselves as white (91%). The largest minority group identified in the project area is Hispanic/Latino (8 %). Less than two percent identified themselves as being outside these two categories.

Table 3.3-1: Racial and Ethnic Populations

Race/Ethnicity	Census Blocks adjacent to I-15 Corridor	Salt Lake County	Utah County
White	91%	87%	92%
Hispanic/Latino	8%	12%	7%
Non-White: Black/African American, Asian, American Indian/Alaskan Native and Native Hawaiian Pacific Islander	<2%	6%	3%

Source: U.S. Census Bureau (2000 data sets). Percentages do not add to 100% because the Hispanic category in the Census is not mutually exclusive from Non-White but is tracked separately by the U.S. Census.

Table 3.3-2: Ethnicity and Income by Census Block Group

Block Group ID	% Non-White	% Hispanic or Latino	% Low-Income
BLOCK GROUPS IN UTAH COUNTY			
1	9%	10%	1%
2	11%	12%	4%
3	8%	7%	8%
4	8%	10%	10%
5	3%	4%	8%
6	3%	2%	12%
7	5%	6%	8%
8	7%	9%	2%
9	3%	2%	8%
10	11%	5%	0%
11	7%	0%	57%
12	17%	18%	11%
13	16%	13%	20%
14	29%	35%	27%
15	15%	19%	4%
16	8%	10%	0%
17	10%	11%	4%
18	14%	13%	15%
19	10%	12%	5%
20	22%	28%	19%
21	19%	22%	20%
22	21%	21%	12%
23	13%	20%	15%
24	19%	17%	5%
25	12%	11%	1%
26	9%	5%	12%
27	10%	4%	16%
28	10%	11%	2%
29	10%	11%	11%
30	8%	9%	12%
31	9%	14%	16%
32	18%	18%	12%
33	11%	10%	5%
34	10%	8%	10%
35	5%	5%	9%
36	6%	10%	17%
37	8%	7%	15%
38	0%	31%	0%
39	7%	10%	9%
40	8%	7%	11%
41	5%	5%	14%
42	9%	5%	23%
43	5%	3%	8%
BLOCK GROUPS IN SALT LAKE COUNTY			
	8%	5%	0%
44	23%	15%	2%
45	8%	8%	8%
46	8%	5%	8%
47	13%	6%	0%
48	13%	9%	6%

% Non-White	% Hispanic or Latino	% Low-Income
PROJECT CORRIDOR AVERAGE		
9%	8%	7%
UTAH COUNTY		
3%	7%	12%
SALT LAKE COUNTY		
6%	12%	8%

KEY
10-17% Minority
18-26% Minority
27% and Above Minority
9-15% Hispanic
16-23% Hispanic
24% and Above Hispanic
8-13% Low-Income
14-20% Low-Income
21% and Above Low-Income

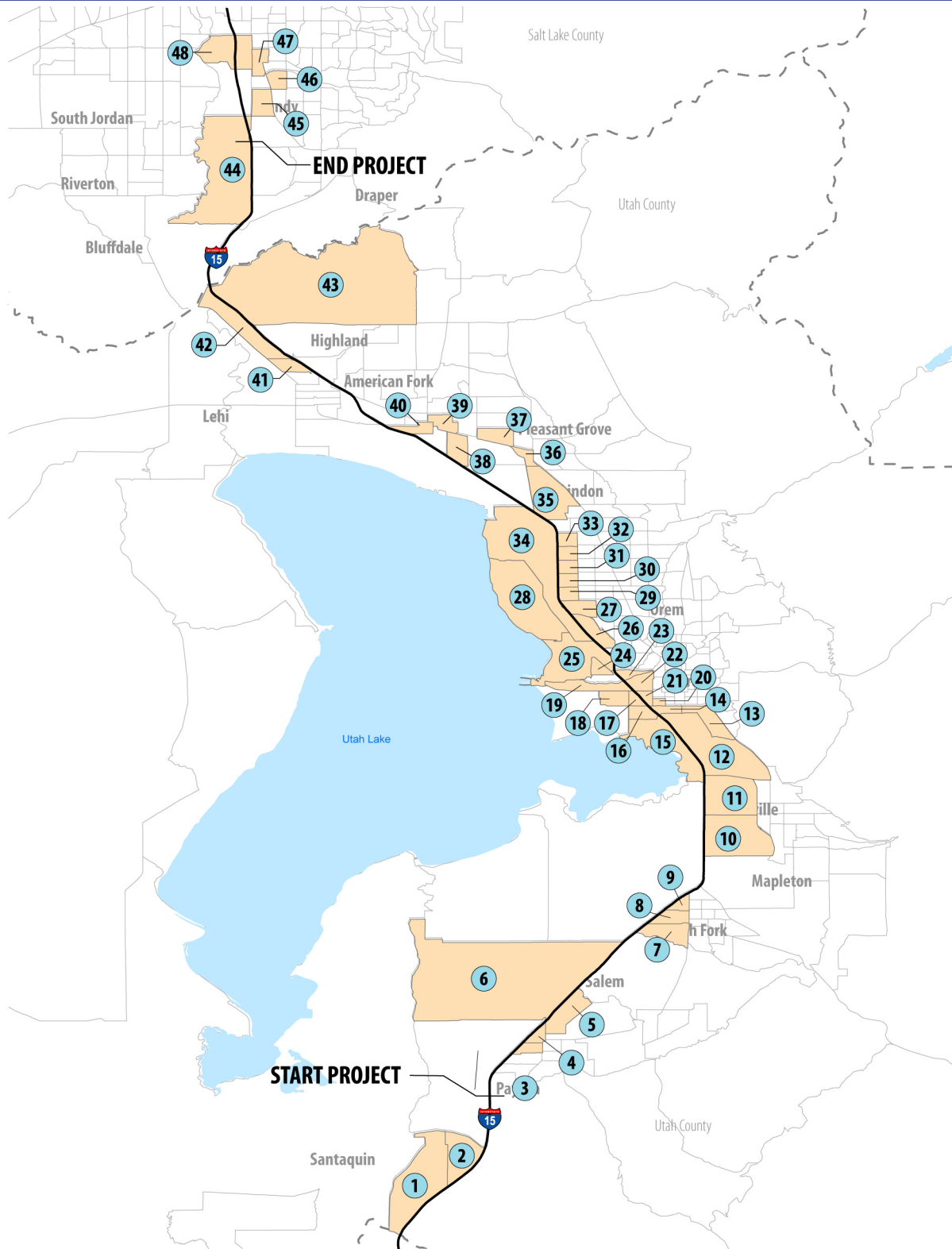


Figure 3.3-1
Census Block Groups

LEGEND:

- 47 Block Group Identification Number
- Census Block Group



3.3.1.2 Limited English Proficiency

In accordance with Presidential Executive Order 13166, linguistic isolation was determined based on whether a household had adults who did not speak English well. Approximately 4 percent of the residents spoke Spanish with limited command of the English language. Within the Hispanic population of the project study area, 29 percent reported that they did not speak English well or at all. According to the 2000 Census, just over 4 percent of the population in the environmental justice study area resided in households that were linguistically isolated. Of those living in linguistically isolated households, 78 percent spoke Spanish, 5 percent spoke another Indo-European language, and 14 percent spoke an Asian or another Pacific Island language. For comparison, 4 percent of Salt Lake County and 2 percent of Utah County residents live in linguistically isolated households. Similar to residents of the project study area, the majority of the population in both counties residing in linguistically isolated households spoke Spanish.

3.3.1.3 Income Characteristics

Table 3-3.3 presents income data for the I-15 study area, and Utah and Salt Lake counties. Residents within the study area have slightly lower median household incomes than the rest of Salt Lake and Utah counties. In Utah County, there is student housing adjacent to the I-15 corridor, which may account for lower median incomes near I-15. The total population of college or graduate school students in the Provo/Orem area is over 41,400 according to the 2005 US Census data. (U.S. Census, 2007).

Approximately 7 percent of the population along the I-15 corridor was below the poverty line in 1999. In comparison, 8 percent of the population of Salt Lake County and 12 percent of the population of Utah County was below the poverty line in 1999 (Tables 3.3-2 and 3.3-3). In 2000, an estimated four percent of households in the project study area received public assistance income. Similarly, in Salt Lake and Utah counties three percent of households received public assistance income.

Table 3.3-3: Income Characteristics

	Census Blocks adjacent to I-15 Corridor	Salt Lake County	Utah County
Below Poverty Level in 1999 (Individuals)	7%	8%	12%
Median Income in 1999 (Households)	\$42,204	\$48,373	\$45,833
Per Capita Income in 1999	\$15,485	\$20,190	\$15,557
Households Receiving Public Assistance Income	4%	3%	3%

Source: U.S. Census Bureau (2000 data sets)

3.3.1.4 Summary of Environmental Justice Characteristics

This analysis indicates that households within the project study area are similar to Utah and Salt Lake counties in regard to income and ethnicity. However, there are a few areas that have notably higher concentrations of low-income, minority, or ethnic populations. Those areas (census block groups) that have higher percentages of low-income, minority, or ethnic populations than the environmental justice study area average are spread throughout the corridor, and are shown in Table 3.3-2.

3.3.2 Environmental Justice Populations Outreach

The I-15 EIS process involved several ways to provide project information and opportunity for involvement by all populations. As the largest group of ethnic populations identified is Hispanic, the use of Spanish in advertising and other informational materials has been incorporated into the program.

A telephone survey was conducted at the start of the project in order to gather input from a wide-range of stakeholders in a method that had scientific reliability of plus or minus 5 percent. Survey results indicated strong concern for transportation issues and interest in multi-modal solutions.

The public outreach campaign began in July 2005 with the launch of the I-15 “Bubble Bus”, a bus wrap advertisement that displayed project information and invited comments. The bus operated on a UTA bus route that operated daily along I-15 and local streets. The text of the advertisement addressed both roadway and transit modes and could be seen by transit users as well as interstate commuters. A Spanish phrase was used on the bus wrap to indicate that other languages would be welcome on the project comment telephone line or in writing. The bus wrap provided a toll-free telephone number and the project website address as methods to learn about the project and provide comment. The telephone comment line greeting also indicated that comments in Spanish were welcome.

Specific media targeting populations, where English is not the primary language, were provided with project updates in conjunction with distribution among other media outlets:

- Univision;
- Telemundo;
- Bustos media;
- El Semanal Magazine;
- Mundo Hispano -KSL munhispano.com;
- Diversity Times;
- La Voz Latina de Utah;
- Nuestro Mundo, Magazine; and
- The Standard Examiner - Spanish Page.

3.3.3 Alternative 1: No Build Impacts

Under Alternative 1, the impacts to environmental justice populations are associated with the existing and future conditions within the project study area. These populations would experience the same traffic and mobility, air quality, noise and community cohesion conditions associated with the existing transportation network as all other I-15 users and communities adjacent to I-15.

The impacts of Alternative 1 to low-income, minority, or ethnic populations are not more adverse than the impacts to other populations, and the impacts are not disproportionately borne by low-income, minority, or ethnic populations when compared to other populations.

3.3.4 Alternative 4: I-15 Widening and Reconstruction Impacts

The impacts of Alternative 4 that have the potential to affect low-income, minority, or ethnic populations include:

- Noise impacts and air quality impacts;
- Impacts to visual quality;
- Traffic/transportation impacts;
- Residential and business relocations;
- Impacts to the community cohesion, and
- Impacts to social and cultural resources.

The determination of whether there would be disproportionately high and adverse impacts on environmental justice populations was made based on available Census information for the block groups adjacent to I-15. While the low-income, minority, or ethnic populations identified in the Census block groups that are adjacent to I-15 may experience some of these impacts, based on the available information, a determination that these impacts would not be disproportionately high and adverse on these population was made. Table 3.3-4 summarizes potential for impacts to these resources. A few of the larger issues are discussed below.

3.3.4.1 Noise and Air Quality

The noise and air quality impacts of Alternative 4 documented in Section 3.7 and 3.8, respectively, were reviewed in the context of the general dispersion of minority or low income populations along I-15. Based upon the review of locations of the 20 noise barriers that extend for 14.5 miles of I-15 of Alternative 4, the proposed locations of noise barriers likely do not have a disproportionately high and adverse impact on any minority or low-income populations.

Section 3.8 of this Chapter addresses air quality impacts. No exceedances of the National Ambient Air Quality Standards (NAAQS) would occur as adverse impacts to any population as a result of Alternative 4.

3.3.4.2 Visual

The visual impacts documented in Section 3.9 were reviewed in the context of the general dispersion of minority or low income populations along I-15. Based upon the review of noise barrier locations, widening of structures and placement of new interchanges along Alternative 4, the proposed project would not have a disproportionately high and adverse impact on any minority or low-income populations.

3.3.4.3 Relocations

Depending on the option in Central Utah County (Options A, B, C or D), and in North Utah County for American Fork Main Street (Options A, B or C), the total amount of property acquisition would range from approximately 478 acres to 544 acres. The number of buildings acquired could range from 61 to 130 buildings. The number of housing units that would be displaced would range from 15 to 88. Business displacements would range from 39 to 69. The Preferred Alternative includes Option D in Provo/Orem and Option C at American Fork, which will displace the fewest residential units (15) and business units (38). Specific information on the ethnicity or income level of each of these household units, businesses and parcels was not available. Given that they are dispersed throughout the 43-mile long I-15 corridor and the average percentage of low income and Hispanic populations in the census block adjacent to I-15 is similar to that of the counties as a whole, it is unlikely that there are disproportionate adverse impacts from relocations for these populations. All affected households and businesses would benefit equally from the provision of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and the Utah Relocation Assistance Act, Utah Code Section 57-12.

3.3.4.4 Impacts to Social and Cultural Resources

Impacts to social and cultural resources could include impacts to meeting halls, public gathering places or cultural resources of special importance to Environmental Justice populations, which might suffer disproportionate, adverse effects. No such adverse effects were identified through survey of archaeological or architectural resources (Section 3.16), or through public outreach (Chapter 5). No such public recreation areas were identified through Section 4(f) review (Chapter 4).

3.3.4.5 Summary of Impacts of Alternative 4

The impact of Alternative 4 on all populations and on environmental justice populations is shown in Table 3.3-4. It is based on available U.S. Census information and the technical analyses presented in the referenced sections of this EIS. Based on the Census block group information, there would be no difference between the level of impacts of the Provo/Orem design Options A, B, C, and D, and the American Fork Main Street Options A, B, and C on environmental justice populations. All populations would share in the benefits of the project.

Table 3.3-4: Summary of Impacts of Alternative 4

Resource	Direct Impact on all Populations	Disproportionate Adverse Impact to Environmental Justice Populations
Access to Transportation (detailed in Chapter 2)	Beneficial impact due to increased capacity and safety for all I-15 users.	No adverse impact, therefore no disproportionate adverse impact.
Community Cohesion (detailed in Section 3.2)	Beneficial impact because of improved access across I-15, new access across I-15, and incorporation of planned pedestrian and bicycle crossings.	No adverse impact therefore no disproportionate adverse impact.
Relocations (detailed in Section 3.4)	Displaced households range from 20 to 117; displaced businesses from 50 to 84; depending on the design option.	Disproportionate adverse impact unlikely. All populations subject to and benefit from Uniform Relocation Assistance and Real Property Acquisition Policies Act and Utah Relocation Assistance Act.
Economic (detailed in Section 3.6)	Regional beneficial impact based on decreased I-15 travel times, increased accessibility, construction generated employment.	No adverse impact, therefore no disproportionate adverse impact.
Noise (detailed in Section 3.7)	Noise level approaches or exceeds Federal standards at 910 receivers.	No disproportionate adverse impact. Impacted receivers include a variety of sensitive types.
Air Quality (detailed in Section 3.8)	No adverse impact.	No adverse impact, therefore no disproportionate adverse impact.
Visual (detailed in section 3.9)	Change to visual environment for all property owners along I-15 and all I-15 users.	Change in visual environment for all property owners along I-15 as well as all I-15 users. No disproportionate adverse impact.
Cultural and Social resources (detailed in Chapters 4 and 5, and Section 3.16)	No adverse effects were identified through survey of archaeological or architectural resources, or through public outreach. No such public recreation areas were identified through Section 4(f) review.	No adverse impact, therefore no disproportionate adverse impact.
Natural Resources	No adverse impacts. All impacts are mitigated.	No adverse impact, therefore no disproportionate adverse impact.

3.3.5 Mitigation

Since no disproportionate adverse impacts to Environmental Justice populations were identified, no mitigation is proposed.

3.4 Relocations

Relocation impacts are associated with the properties that would be directly affected by the acquisition of additional right-of-way. These relocation impacts would affect residential, commercial, vacant and agricultural properties. The properties either fall within or adjacent to the proposed new right-of-way, are very close to the proposed new right-of-way or pavement surfaces, or cannot be safely accessed due to roadway improvements. Project plans and aerial photographs were used in making these determinations.

Where property acquisition is necessary, land owners are compensated under the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. In the State of Utah, for transportation projects, the Utah Department of Transportation (UDOT) is the lead agency responsible for the Federal Relocation Program and the State of Utah Relocation Program (as defined by the Utah Relocation Assistance Act, Utah Code Section 57-12). Under these laws, if an individual is required to move as a result of a Federal or federally assisted program or from a State or state assisted program or project, assistance will be provided.

These measures are intended to provide consistent policies and fair and equitable treatment of individuals affected by state and federal activities. The Utah Department of Transportation works with owners of properties from which right-of-way is required for a project.

When an easement is purchased, UDOT would acquire the right to use the property for a specific purpose and the property owner would retain title to the land. If the property owner's residence or business must be displaced, UDOT will work with affected individuals to assure that appropriate assistance is provided.

3.4.1 *Analysis Methodology*

The conceptual engineering drawings in Volume II of this EIS provided the basis from which impacts were determined. The proposed environmental impact limit line is shown as a yellow line on these drawings. This environmental limit line was established based on the conceptual engineering conducted for the alternatives and the options within Alternative 4. It was generally established as a 50-foot offset from the shoulder of the Alternative 4 I-15 mainline, a 25-foot offset from the shoulder of ramps, and a 15-foot off-set from the shoulder of cross streets and from the frontage roads in Options A and B. These offsets take into account grade differences and resulting slopes. The environmental limit line also incorporates the area required to accommodate temporary construction activity. Buildings that would be displaced are shown with hatched markings on these drawings. Parcels that would be fully acquired are noted as "full" take in the parcel tables in Volume II.

The identification of impacts to properties and buildings followed these guidelines:

- The amount of property impacted within the environmental impact limit line is approximate and was calculated using the conceptual engineering drawings in Volume II and the Counties' Assessor's office parcel information.
- Parcels were generally assumed to be full takes under the following conditions:
 - If a building is located within 15 feet of the edge of the proposed roadway improvement;
 - If access to a property is removed as a result of the alternative in question; or
 - If approximately 50 percent of the total parcel area would be impacted. However, if 50% of the remaining parcel appeared to be deemed "reasonably usable", it was not counted as a full take.
- Where commercial building or multi-family structures would be acquired, field verification was used to determine the number of businesses within the building and the number of dwelling units within the structures, respectively.

- Using the tax assessors' databases for Salt Lake County and Utah County and aerial photography mapping, the type of affected property was determined (residential, commercial, industrial, etc.).
- For multi-family residential units, the number of residential units that would be displaced was verified through field verification.
- The number of businesses that would be displaced was verified through field verification.

The above guidelines were applied to each alternative and to the design options within Alternative 4 in the Provo/Orem and American Fork Main Streets areas.

3.4.2 Alternative 1: No Build Alternative

The proposed project improvements on I-15 would not be constructed and no parcel acquisitions or building displacements would occur.

3.4.3 Alternative 4: I-15 Widening and Reconstruction

The majority of Alternative 4 can be constructed within the existing I-15 right-of-way. However, construction of some of the proposed improvements in Alternative 4 would require acquisition of land from adjacent parcels along the project corridor. Both full parcel acquisitions and partial parcel acquisitions would occur, resulting in the conversion of existing property to roadway use. Potential building displacements would occur where full parcel acquisition is needed for the proposed project. Potential parcel acquisitions for Alternative 4 are summarized in Table 3.4-1.

Depending on the option selected in Central Utah County (Options A, B, C or D), and in North Utah County for American Fork Main Street (Options A, B or C), the total amount of property acquisition would range from approximately 478 acres to 554 acres. The number of buildings acquired could range from 61 to 130 buildings. The number of housing units that would be displaced would range from 15 to 88. Business displacements would range from 37 to 69. The Preferred Alternative includes Option D in Provo/Orem and Option C at American Fork, which will displace the fewest residential units (15) and business units (46). Table 3.4-1 lists impacts by different option.

3.4.3.1 Indirect Impacts

Businesses displaced by Alternative 4 could potentially relocate into other commercial developments within the adjacent cities or within Utah County. These relocations may have an indirect impact on the commercial developments into which existing dislocated businesses relocate. This impact may be positive or negative depending on whether the relocated businesses contribute to the overall viability of the commercial development or introduce direct competition for existing businesses in that development.

3.4.4 Mitigation

Where potential building displacements will occur as a result of parcel acquisitions, compensation will be provided to affected property owners. Compensation for parcel acquisitions, including buildings and structures will be provided at fair market value. In providing compensation, the proposed project will comply with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and the Utah Relocation Assistance Act (Utah Code Section 57-12). These regulations require that relocation services will be provided to all affected property owners without discrimination.

Under state and federal regulations, no person is required to move from their residence unless comparable replacement property is available for sale or rent within the potentially displaced person's financial capabilities. The location and sale or rent price of the comparable property must be made available in writing to the affected persons. In the event that replacement housing may not be available within the local resident's financial capabilities, several alternative solutions may be used. The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended states the following:

SEC. 206. (a) If a program or project undertaken by a Federal agency or with Federal financial assistance cannot proceed on a timely basis because comparable replacement dwellings are not available, and the head of the displacing agency determines that such dwellings cannot otherwise be made available, the head of the displacing agency may take such action as is necessary or appropriate to provide such dwellings by use of funds authorized for such project. The head of the displacing agency may use this section to exceed the maximum amounts which may be paid under sections 203 and 204 on a case-by-case basis for good cause as determined in accordance with such regulations as the head of the lead agency shall issue.

(b) No person shall be required to move from his dwelling on account of any program or project undertaken by a Federal agency or with Federal financial assistance, unless the head of the displacing agency is satisfied that comparable replacement housing is available to such person.

Options under this provision may include the following:

- Purchasing housing for the displaced person and renting or selling the acquired dwelling at a price within the person's financial means;
- Renovating existing housing;
- Providing financing for the homeowner occupants with low incomes and/or poor credit ratings who have occupied their home for at least 180 days; and
- Entering into partnerships with public or private agencies that provide housing for low-income persons.

UDOT will work with affected property owners to ensure that appropriate replacement housing opportunities are made available to all potentially displaced residents within the proposed project corridor.

Table 3.4-1: Summary of Alternative 4 Relocation Impacts

Geographic Section	Parcels Affected			Acquisition Type*	Area Acquired (Acres)	Buildings Acquired	Housing Units Displaced	Businesses Displaced
	Total	City/State	Private					
SOUTH UTAH COUNTY	167	6	161	14 Full; 147 Partial	90	10	1	7
CENTRAL UTAH COUNTY								
Option A	325	38	287	105 Full; 182 Partial	137	79	73	39
Option B	304	28	276	99 Full; 177 Partial	118	67	19	38
Option C	214	34	180	25 Full; 155 Partial	89	19	55	8
Option D	220	24	196	44 Full; 152 Partial	75	34	2	16
Central Utah County, Common Sections	229	9	220	24 Full; 196 Partial	41	18	10	4
NORTH UTAH COUNTY								
American Fork Main Street Option A	63	8	55	9 Full; 46 Partial	49	7	1	9
American Fork Main Street Option B	89	7	82	11 Full; 71 Partial	61	11	3	9
American Fork Main Street Option C	64	8	56	18 Full; 38 Partial	63	16	1	10
North Utah County, Common Sections	328	29	299	25 Full; 274 Partial	145	7	1	9
SOUTH SALT LAKE COUNTY	79	19	60	5 Full; 55 Partial	78	0	0	0

The Preferred Alternative includes Option D in Provo/Orem and Option C in American Fork, plus all the common sections of Alternative 4: I-15 Widening and Reconstruction

* "Full" means the entire property would be acquired. "Partial" means only a portion of the property would be taken. This column does not include city or state owned parcels.

3.5 Farmland

This section describes the farmland characteristics of the I-15 study area. Included are descriptions of the affected environment, potential impacts of the alternatives, and any required mitigation measures. The study area for the farmland and agriculture analysis is defined as agricultural lands on either side of the existing I-15 freeway. The United States Department of Agriculture (USDA) Census of Agriculture was used to provide information on farms in Utah and Salt Lake counties. Additionally, existing information from the Natural Resources Conservation Service (NRCS) and Utah and Salt Lake counties was used to identify important farmland areas along the project corridor.

3.5.1 *Affected Environment*

This discussion of the affected environment includes a description of the regulatory context associated with farmland protection and a general discussion of the existing farmlands in Utah and Salt Lake counties. This section discusses protected farmlands located within the study area and farmlands specifically classified as prime, unique, and state wide importance, and the Agricultural Protection Areas near the project corridor. The EIS team studied farmland that is contiguous with or abuts I-15, where Alternative 4 could prevent, reduce, or prohibit farming practices.

3.5.1.1 Regulatory Context

The Farmland Protection Policy Act of 1981 (7 USC 4201-4209) requires that federal projects minimize the conversion of farmland to nonagricultural uses and that such projects consider state and local farmlands protection policies to the greatest extent practical. The Act protects prime and unique farmlands, as well as farmlands of statewide or local importance. The USDA Soil Surveys for Utah and Salt Lake counties indicate that protected farmlands are located within the study area (NRCS, 2004).

According to the policy and interpretation by the Utah Natural Resources Conservation Service (NRCS), the agency with oversight, however, the Act pertains only to farmlands located *outside* municipal boundaries. Farmlands located inside incorporated municipal boundaries and/or farmlands committed to urban development, are not protected under the policy. As such, farmlands identified for future development within a municipality's general land use plan would not be protected under the policy (NRCS, 2005). That Farmland Protection Policy (7 USC 658.2) states:

"Farmland means prime or unique farmlands as defined in section 1540(c)(1) of the Act or farmland that is determined by the appropriate state or unit of local government agency or agencies with concurrence of the Secretary to be farmland of statewide or local importance. "Farmland" does not include land already in or committed to urban development or water storage. Farmland "already in" urban development or water storage includes all such land with a density of 30 structures per 40-acre area. Farmland already in urban development also includes lands identified as "urbanized area" (UA) on the Census Bureau Map, or as urban area mapped with a "tint overprint" on the USGS topographical maps, or as "urban-built-up" on the USDA Important Farmland Maps. Areas shown as white on the USDA Important Farmland Maps are not "farmland" and, therefore, are not subject to the Act. Farmland "committed to urban development or water storage" includes all such land that receives a combined score of 160 points or less from the land evaluation and site assessment criteria."

In addition to the three types of farmland covered by the Farmland Protection Policy Act, the Utah Agricultural Protection Act also provided a mechanism for the protection of farmlands. The categories of farmlands are defined below.

Prime Farmland

Section 2 of the Farmland Protection Policy Act defines prime farmlands as the land with the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops with the minimum input of fertilizer, pesticides, and labor. This includes lands that possess the above characteristics but are being used to produce livestock and timber (USC, 1981). Some soils that are identified as "Prime farmland" can be

categorized as “Prime farmland if irrigated,” this reflects that some soils require watering by irrigation in order to be productive farmlands. This is applicable to all of the Prime Farmlands in this analysis,

Unique Farmland

Unique Farmland is defined as land that is used for production of specific high value food and fiber crops. The land must have the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed (including water management) according to acceptable farming methods. Examples include citrus, nut, fruits, and vegetable crops (USC, 1981).

Farmland of Statewide Importance

These farmlands are defined as having local importance for the production of food, fiber, and oil crops. These farmlands are typically lesser quality than prime farmlands but have the necessary physical and chemical properties to sustain high quality agricultural yields (USC, 1981). These farmlands are located throughout incorporated and unincorporated areas of Utah County and within developed areas of Salt Lake County, the NRCS soil survey does not identify farmlands of “local importance” but does use the classification of “Farmland of Statewide Importance” and that nomenclature is what is discussed below in the farmland impacts section (NRCS, 2004).

Agricultural Protected Farmlands

Farmlands that are not protected by the Federal government but are protected instead by the State of Utah (in the Agricultural Protection Act, Utah State Code 17-41) are identified as agricultural protected farmlands (Utah, 2002). The Agricultural Protection Areas (APA) are typically established by the owner to protect a farming operation from nuisance complaints regarding noise, odors, and sounds resulting from normal agricultural operations. There are six APA's in Utah County. They are located near Payson, Spanish Fork area, Orem, and American Fork (Utah County, 2005). There are no agricultural protected farmlands in Salt Lake County within the study area. The issue of potential impacts to the APAs in Utah County was identified through public comment received during the preparation of this EIS. The locations of the six APAs are shown on Figure 3.5-1.

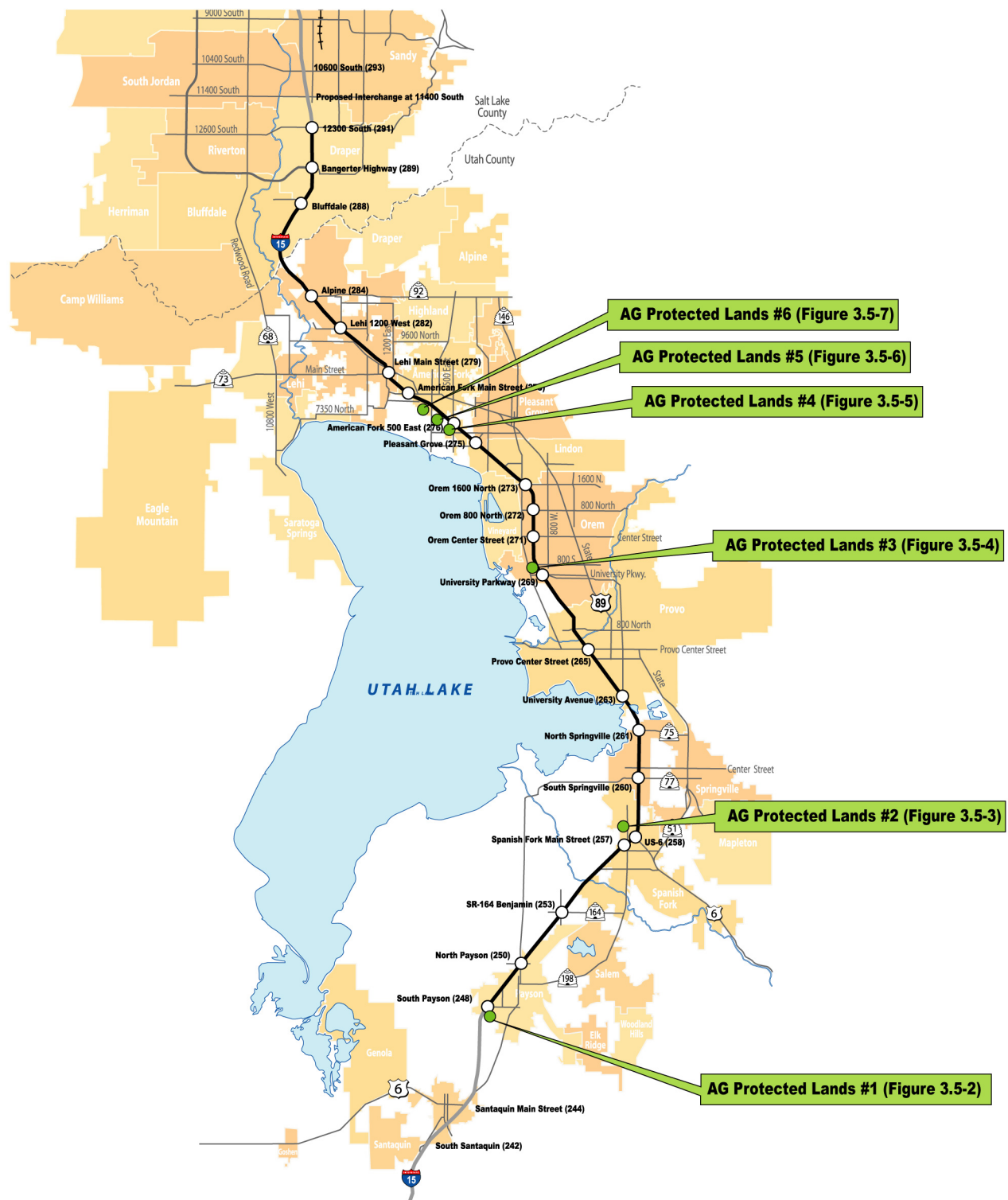
According to Utah Administrative Code Section 17-41-405 (4)(a) Agricultural Protection Areas cannot be condemned for highway purposes unless: (1) the landowner requests the removal of the designation, or (2) the applicable legislative body (that is, the legislative body of the county, city, or town in which the agriculture protection zone is located) and the advisory board approve the condemnation, provided that "there is no reasonable and prudent alternative to the use of the land within the agriculture protection area for the project."

APA status is typically maintained even after a property is developed and no longer in agricultural use, unless the property owner files a petition to remove the land from the APA. When this occurs, the rest of the APA can maintain its protection status, and the boundaries of the APA are redefined.

3.5.1.2 Existing Farmlands

According to the USDA National Agricultural Statistics 2002 Census of Agriculture, the amount of agricultural land in Utah and Salt Lake counties has declined over the last 10 years (USDA, 2002). In 2002, in Utah County, approximately 343,072 acres of farmland remained, down eight percent from the last Census of Agriculture in 1997. There were approximately 82,267 acres of farmland remaining in Salt Lake County, down 31 percent from 1997. Although the total acreage decreased in that time frame, the number of farms increased slightly, by less than one percent for both counties. Most farms in both counties are 49 acres or less.

Where there are farmlands, the majority of farming activities occur in Utah County. Prime farmlands are located along the I-15 corridor in Utah County. Unique farmlands are mostly located in areas of Utah County (NRCS, 2004). Farmlands are located within Salt Lake County but mostly within developed areas of the County. Farms in both counties are typically used to pasture livestock. Other typical uses include raising forage crops or small grains. Farmlands in Utah County are located on both sides of I-15 between Payson and Lehi. Existing farmlands in Salt Lake County occur on the west side of I-15, south of 14600 South on the west side of I-15 in Bluffdale, and south of 12300 South.



Scale in Miles
0 1 2 3 4 5

Figure 3.5-1

Agricultural Protection Areas in the I-15 Project Corridor

LEGEND:

- Locations of Agricultural Protected Lands (Dots are not to scale)



3.5.2 Farmland Impacts

The potential impacts to farmlands that will be caused by Alternative 1 and Alternative 4 are described in this section.

3.5.2.1 Alternative 1: No Build

The No-Build Alternative does not contain improvements to I-15 in the study area and therefore would not have adverse impacts to farmlands or agriculture within the I-15 corridor.

3.5.2.2 Alternative 4: I-15 Widening and Reconstruction

The project alignment drawings, property impact tables and aerial photographs were reviewed to determine potential impacts to the prime, unique, and of statewide importance farmlands. Also identified were potential impacts to the Agriculture Protection Areas (APA) under the Utah Agricultural Protection Act.

In Salt Lake County, the project corridor is almost entirely located within incorporated municipal boundaries. Thus, the Farmland Protection Policy Act would not apply to farmlands in these incorporated areas. Farmlands located outside of municipalities are located in Utah County, particularly along the western highway segment between Spanish Fork and Payson.

Impacts were analyzed using the known existing right-of-way lines and the proposed environmental impact line for Alternative 4. If farmland that has been determined Prime, Unique, or of Statewide Importance is impacted, a Farmland Conversion Impact Rating Form must be completed by the federal agency (or the agency's representative) and the NRCS. The project team coordinated with the local NRCS field office to identify potentially affected farmland in the project area and to evaluate impacts¹ (Grow, 2007). The NRCS evaluated Alternative 4 to determine a Farmland Conversion Impact Rating (Form CPA-106 in Appendix A). This form includes the total acres of farmland to be converted directly and indirectly, a land evaluation of the number of farmland acres by type that would be affected, and a corridor assessment using 10 land use criteria. The NRCS is required to consider alternatives that avoid impacts and measures to minimize harm to prime farmlands if the land evaluation criteria and the site assessment criteria total 160 or more points.

The conversion impact rating for Alternative 4 totaled 112 points, below the 160-point threshold for avoidance alternatives analysis. Thus the impacted farmland would not be subject to avoidance alternatives analysis under the provisions of the Farmland Protection Policy Act. However, for the purpose of disclosing the information, the potential farmland impacts are summarized below. Impacts to the APAs are specifically identified and illustrated.

South Utah County

Based on farmland classification data collected from the Natural Resource Conservation Service's web soil survey, widening of the highway and other proposed improvements to I-15 would affect farmland. Much of the mainline alignment passes through areas classified as Prime Farmland. Other farmland classifications through which the I-15 corridor passes, and that are located outside of municipal boundaries, include "Farmland of Statewide Importance", and "Farmland of Unique Importance."

Using the conceptual engineering plans shown in Volume II of this EIS; 54 acres of farmland in South Utah County Section would be affected by potential parcel acquisitions and conversion to freeway use. This farmland falls into the classifications of either Prime Farmland or Farmland of Statewide Importance. In general, there is a greater prevalence of Prime Farmland" in South Utah County Section than Farmland of Statewide Importance.

The South Utah County Section has the most unincorporated land in the project corridor. Much of the area adjacent to and immediately east of the existing mainline is both unincorporated and classified as either Prime Farmland or Farmland of Statewide Importance. As these lands abut I-15 and additional ROW that will be acquired for Alternative 4, it is likely that impact to this farmland would occur. Where farmland is acquired and converted to freeway use, future agriculture use would be precluded.

¹ Grow, Raymond, 2007. Personal communication in meetings, telephone and email correspondence of Raymond Grow, NRCS Utah, and Lani Eggertsen-Goff, PB, May 1, 9, 10, 23, 25, 29 and 31, 2007.

Two Agricultural Protection Areas are located within South Utah County Section adjacent to the I-15 corridor. These APAs may be minimally impacted by Alternative 4. The location of the APAs and impacts are illustrated in Figures 3.5-2 and 3.5-3. The initial location of a potential drainage basin in Alternative 4 intersected the northwest corner of the APA illustrated in Figure 3.5-3. This proposed drainage basin location was moved slightly to the north to avoid impacts to this APA.

Central Utah County

The Central Utah County Section is more developed and contains less agricultural land than South Utah County Section, but the project would still affect farmlands to varying degrees depending on final design of Alternative 4. This section has little land outside municipal boundaries. The main area of unincorporated land in Central Utah County Section is southwest of Provo's southern boundary. As in South Utah County Section, Central Utah County Section farmland adjacent to I-15 is characterized as primarily Prime Farmland, and Farmland of Statewide Importance. In general, there is a greater prevalence of Prime Farmland in Central Utah County Section. Impacts by design option are discussed below:

Option A: Under Option A, 9.23 acres of farmland would be affected, which include 0.15 acre of Prime Farmland and 9.08 acres of Farmland of Statewide Importance.

Option B: Under Option B, 9.23 acres of farmland would be affected, which include 0.15 acre of Prime Farmland and 9.08 acres of Farmland of Statewide Importance

Option C: Under Option C, 0.45 acres of farmland classified as Farmland of Statewide Importance would be affected.

Option D (Preferred): Under Option D, 0.45 acres of farmland classified as Farmland of Statewide Importance would be affected.

Agricultural Protection Area

One APA is located within Central Utah County Section within 0.15 mile of the I-15 corridor. This APA will not be impacted by Alternative 4. The location of the APA is illustrated in Figure 3.5-4.

North Utah County

North Utah County Section also contains a mix of farmland classifications. There are portions of "Farmland of Statewide Importance", "Farmland of Unique Importance" and Prime Farmland. The amounts of land affected for the Design Options in North Utah County Section are as follows:

American Fork Option A (Diamond Interchange): 10.94 acres of farmland would be affected, which include 1.43 acres of Prime Farmland and 9.50 acres of Farmland of Statewide Importance.

American Fork Option B (South SPUI Interchange): 42.47 acres of farmland would be affected, which include 29.81 acres of Prime Farmland and 12.66 acres of Farmland of Statewide Importance.

American Fork Option C ((North SPUI Interchange (Preferred)): 15.54 acres of farmland would be affected, which include 4.92 acres of Prime Farmland and 10.62 acres of Farmland of Statewide Importance.

Agricultural Protection Areas

The location of the APAs and impacts within North Utah County are illustrated in Figures 3.5-5 through 3.5-11.

One APA south of the 500 East American Fork interchange would be impacted by Alternative 4, regardless of American Fork Main Street option (Figure 3.5-5). At this location, Alternative 4 would convert approximately 0.26 acres of agricultural land to transportation use. Option B at American Fork Main Street would convert 5.09 acres of APA lands to transportation use, as shown on Figure 3.5-10.

South Salt Lake County

In this section, only a small part of the I-15 alignment passes through unincorporated areas. The largest unincorporated area in this section includes “Not Prime Farmland” classifications with steep slope soil that make it unsuitable for farming. In addition, only a small portion of the alignment passes through farmland, resulting in few impacts on farmland in this section. Approximately 0.02 acres of farmland in the South Salt Lake County Section would be affected by Alternative 4. No APAs are located within South Salt Lake County Section near the I-15 corridor.

3.5.2.3 Comparison of Impacts -- Alternative 4 Design Options

Tables 3.5-1 and 3.5-2 summarize the impacts of Alternative 4 Design Options in the Central Utah County and North Utah County sections. The Preferred Alternative is Alternative 4: Widening and Reconstruction with Option C at American Fork Main Street, and Option D in the Provo/Orem area.

Table 3.5-1: Comparison of Impacts in the Provo/Orem Area

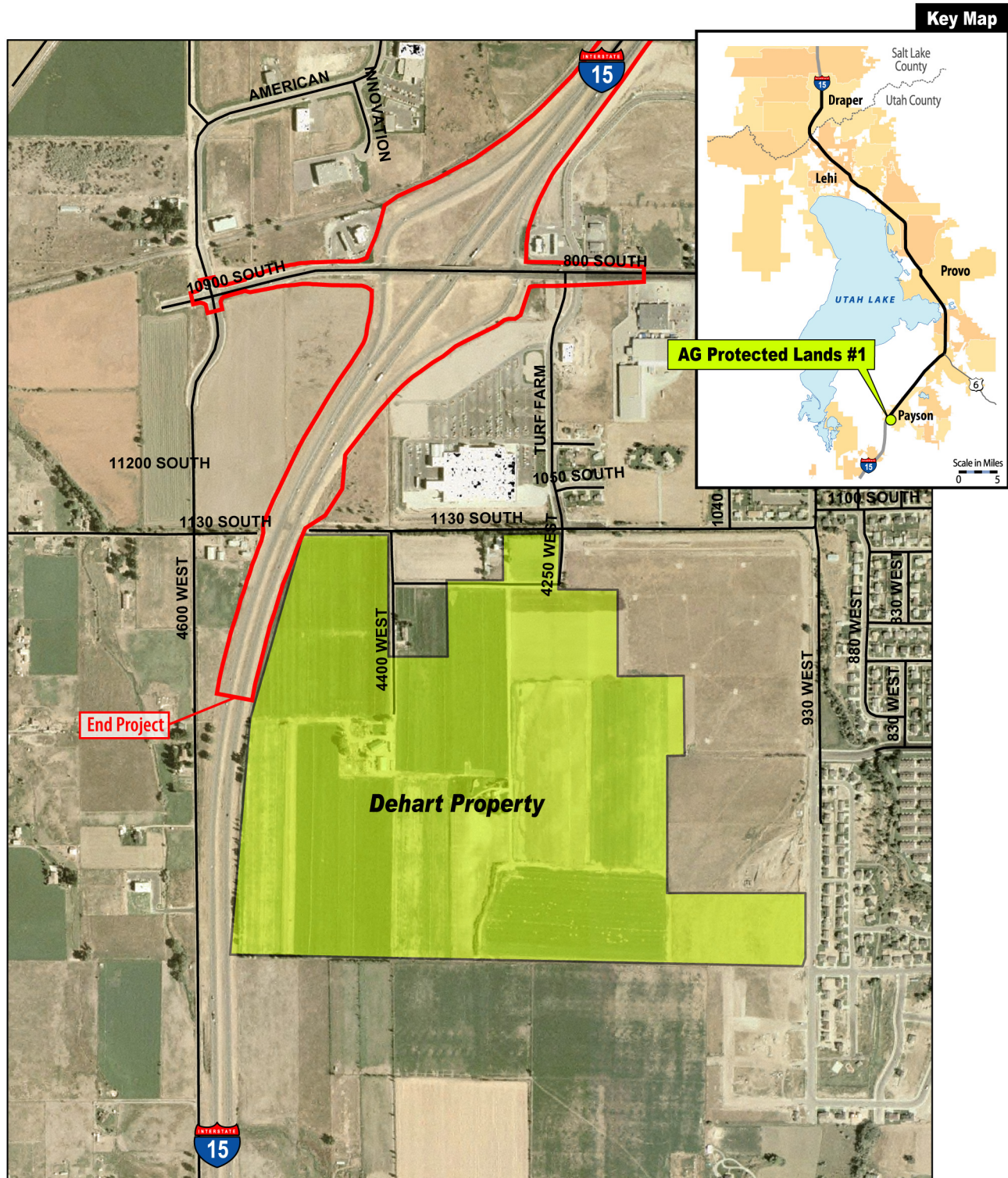
Option	APA Impacts (acres)	Prime Farmland Impacts (acres)	Farmland of Statewide Importance Impacts (acres)
A	None	0.15	9.08
B	None	0.15	9.08
C	None	None	0.45
D (Preferred)	None	None	0.45

Table 3.5-2: Comparison of American Fork Main Street Interchange Design Options

Option	APA Impacts (acres)	Prime Farmland Impacts (acres)	Farmland of Statewide Importance Impacts (acres)
A - Diamond	None	1.43	9.50
B - South SPUI	5.09	29.81	12.66
C - North SPUI (Preferred)	None	4.92	10.62

The land in agricultural production along I-15 will be able to continue in its current uses because Alternative 4 generally does not bisect any farms, does not eliminate access for agriculture areas, or affect their ability to remain agriculturally productive properties. American Fork Main Street Option B; however, would bisect the Allred property APA illustrated on Figure 3.5-10. Although an existing roadway currently bisects that property, the roadway would be widened with this option.

UDOT will maintain access to existing farmland and agricultural areas as part of the roadway design. Potential effects on the irrigation systems, including ditches, canals, and ponds, will be avoided or reconstructed as part of the design of Alternative 4. These facilities will be relocated and reconstructed to maintain continuity and use of the water delivery systems.



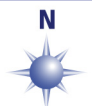
Scale in Miles
0 0.05 0.1

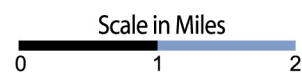
Figure 3.5-2
Agricultural Protection Areas & Impacts - South Payson

LEGEND:

Alternative 4 Area of Impact

Agricultural Protected Land





Agricultural Protection Areas & Impacts - Spanish Fork

 Agricultural Protected Land



Figure 3.5-4

Agricultural Protection Areas & Impacts - Orem

LEGEND:

Alternative 4 Area of Impact

Agricultural Protected Land



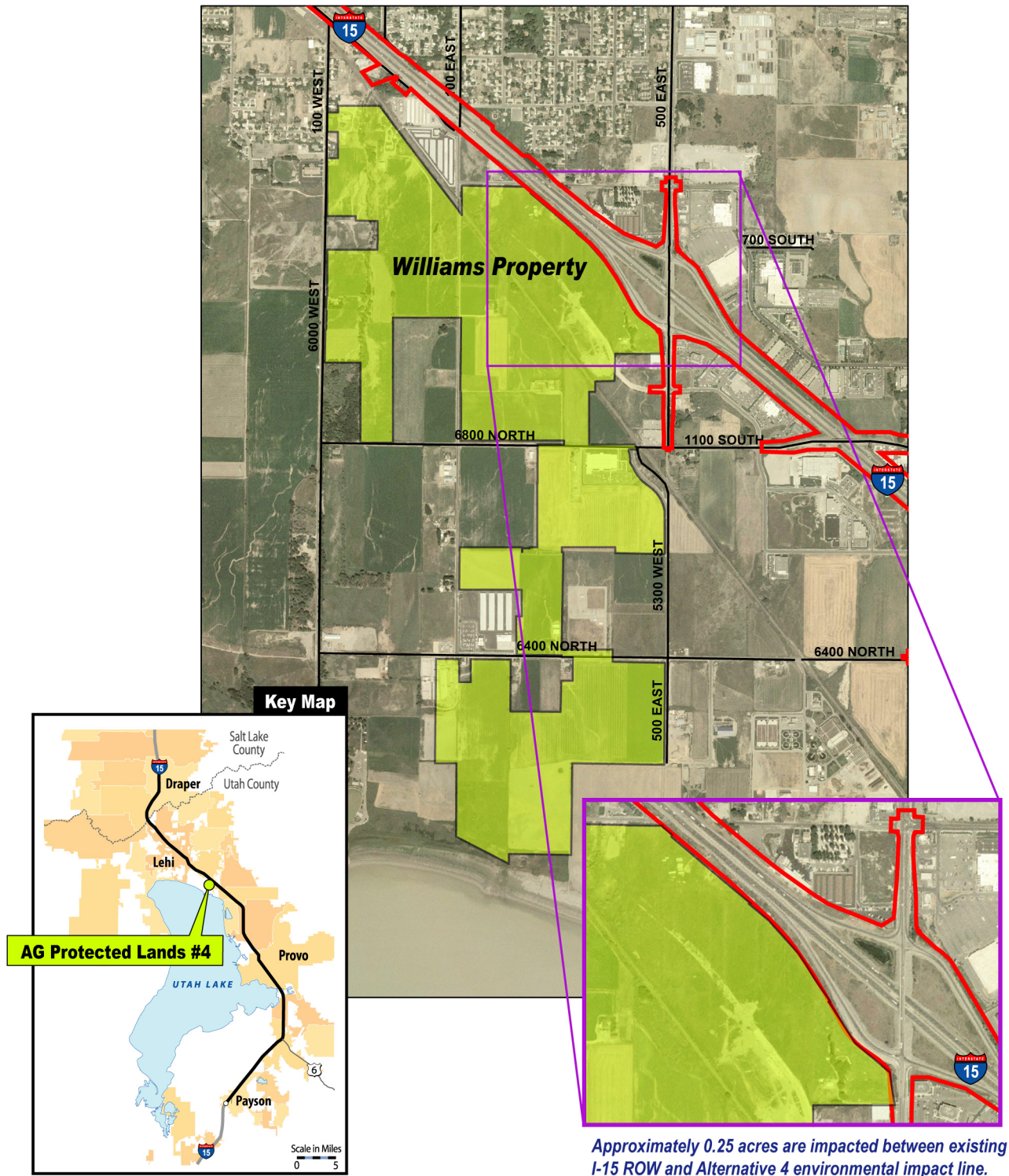


Figure 3.5-5

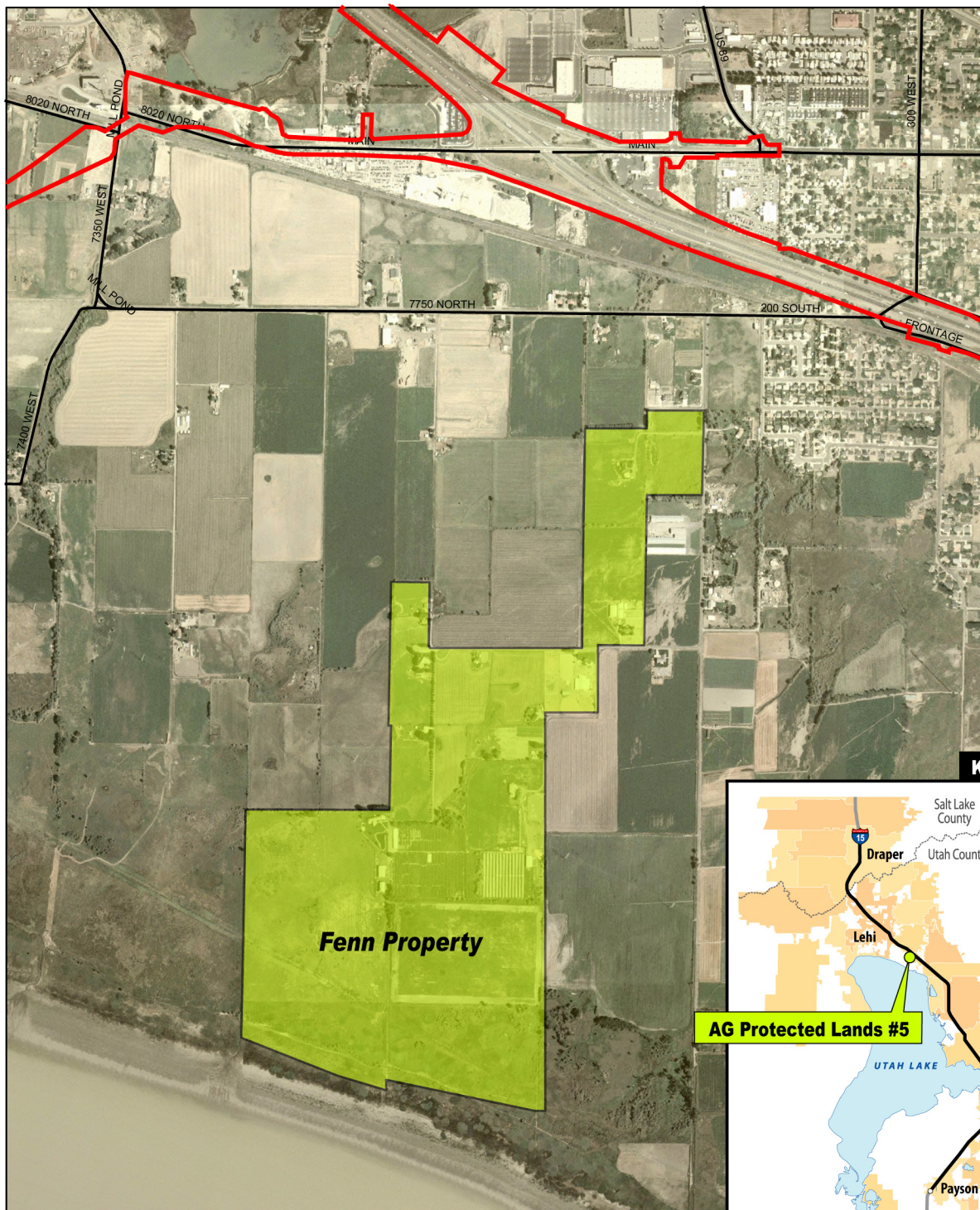
Agricultural Protection Areas & Impacts - American Fork

LEGEND:

Alternative 4 Area of Impact

Agricultural Protected Land





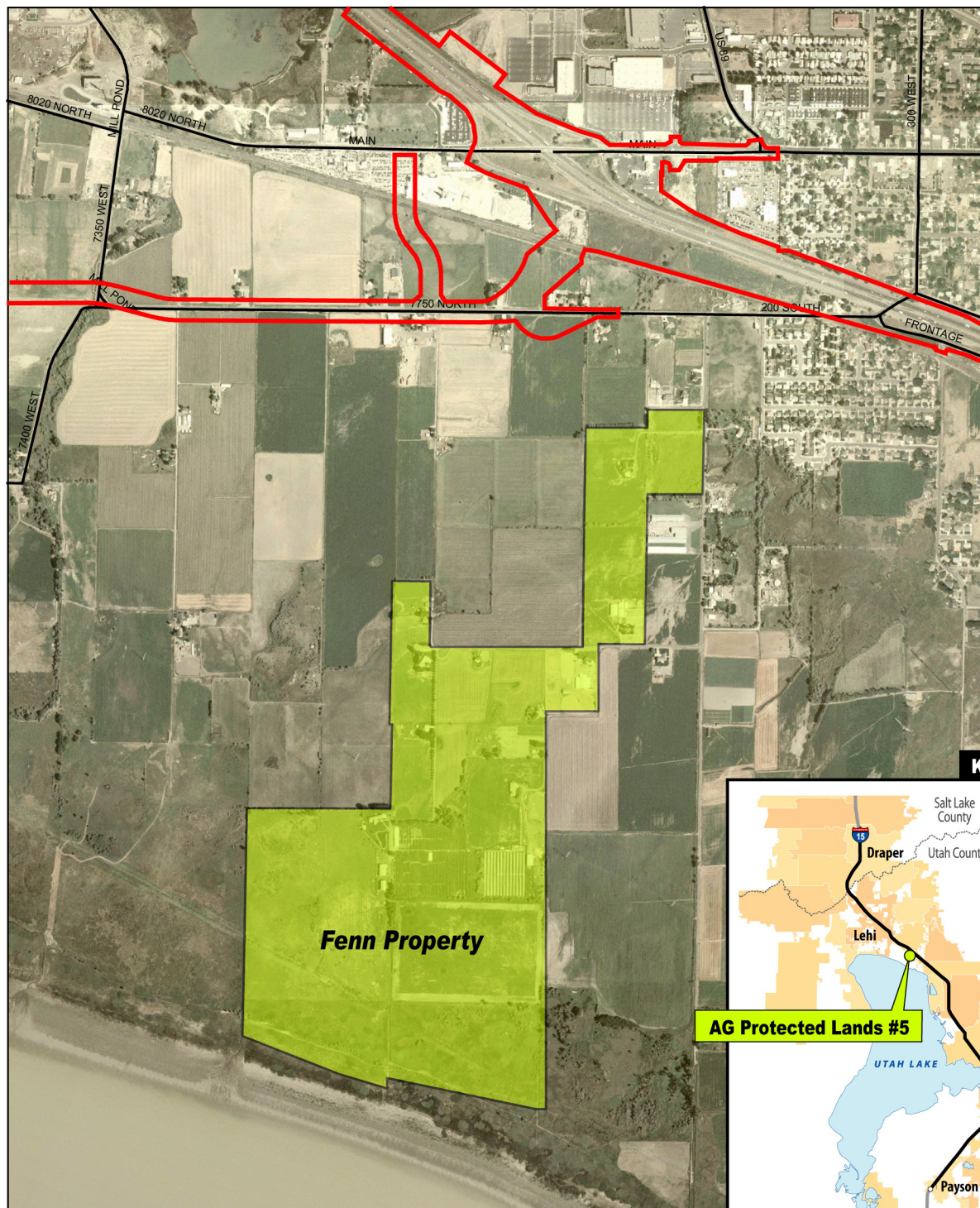
Scale in Miles
0 0.05 0.1

Figure 3.5-6
Agricultural Protection Areas & Impacts - American Fork - Option A

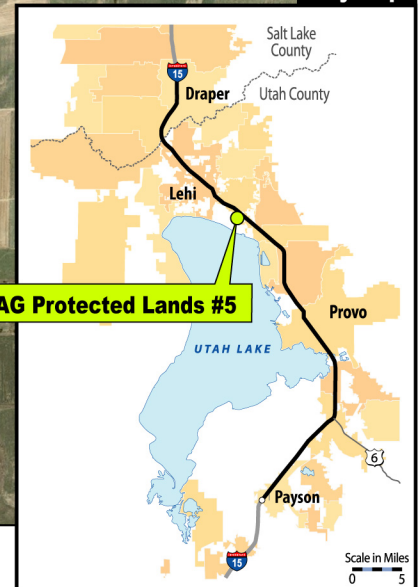
LEGEND:

- Alternative 4 Option A Area of Impact
- Agricultural Protected Land





Key Map



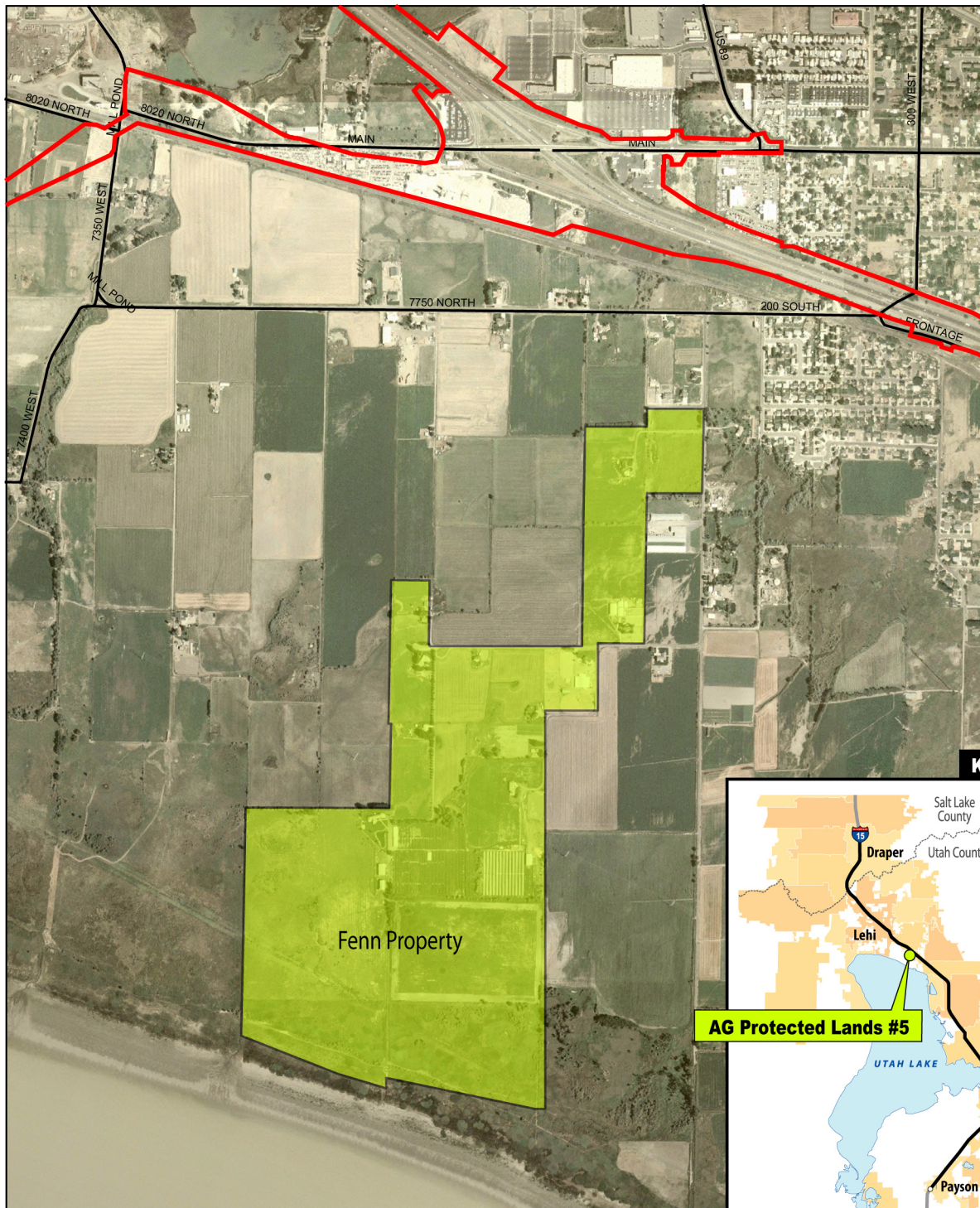
Scale in Miles
0 0.05 0.1

Figure 3.5-7
Agricultural Protection Areas & Impacts - American Fork - Option B

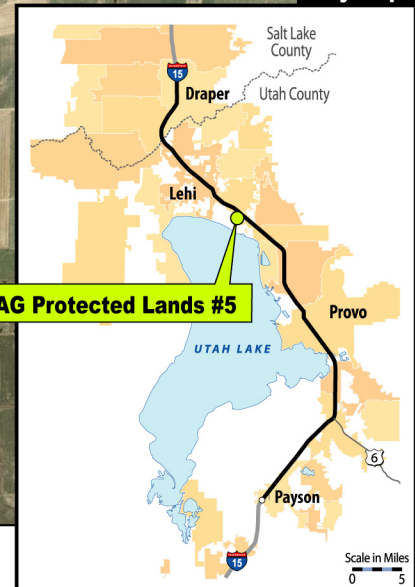
LEGEND:

- Alternative 4 Option B Area of Impact
- Agricultural Protected Land





Key Map



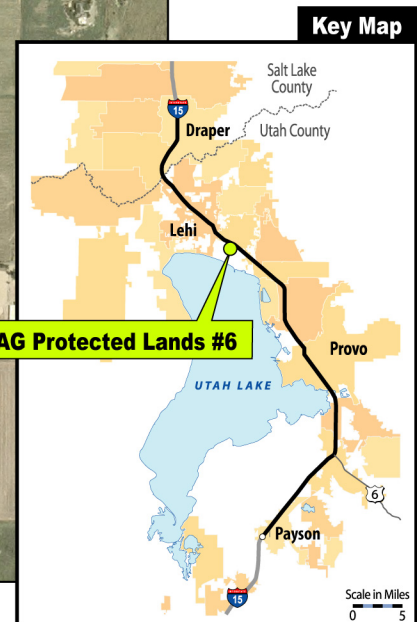
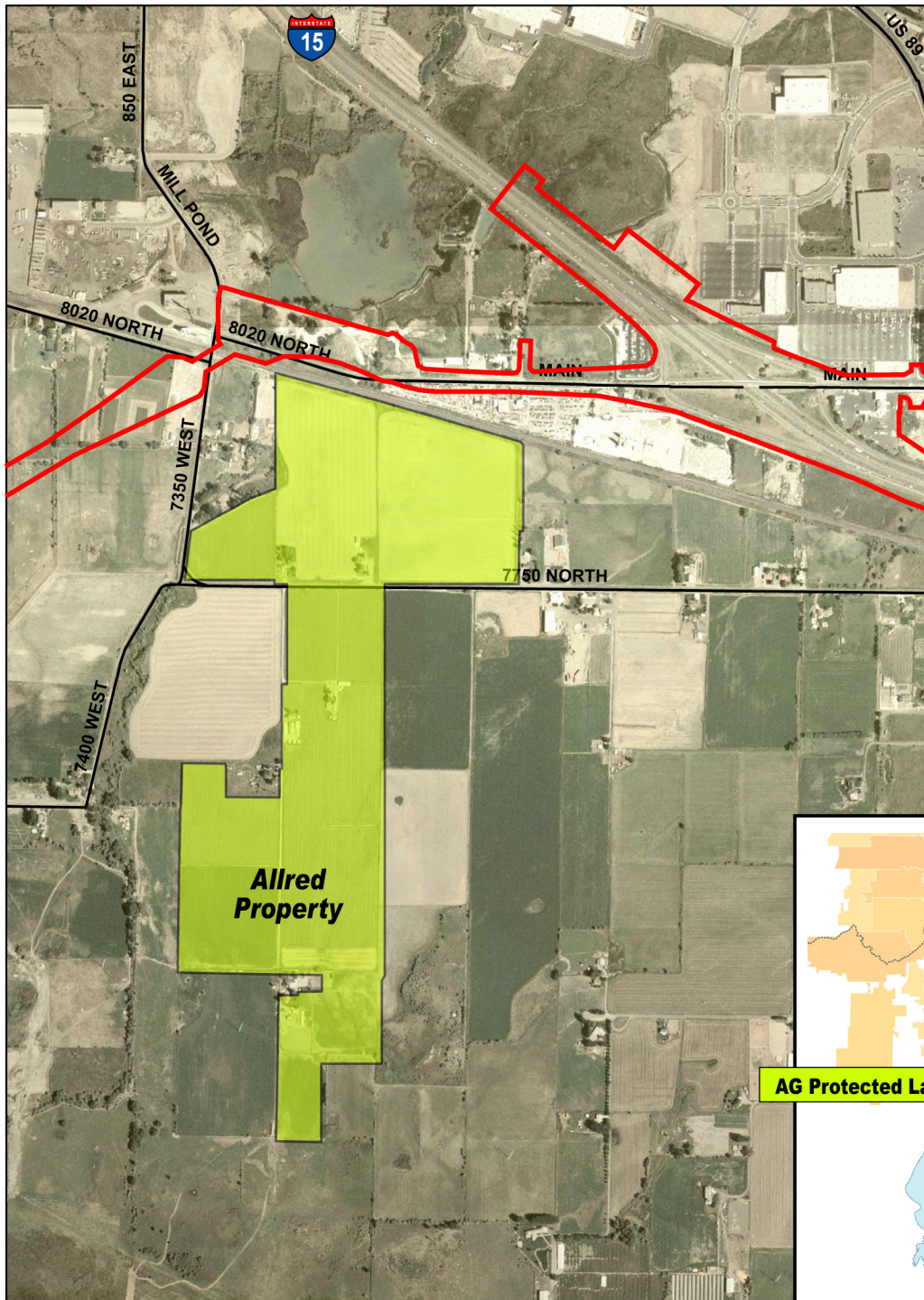
Scale in Miles
0 0.05 0.1

Figure 3.5-8
Agricultural Protection Areas & Impacts - American Fork - Option C (Preferred)

LEGEND:

- Alternative 4 Option C Area of Impact
- Agricultural Protected Land





Scale in Miles
0 0.2 0.4

Figure 3.5-9
Agricultural Protection Areas & Impacts - American Fork - Option A

LEGEND:

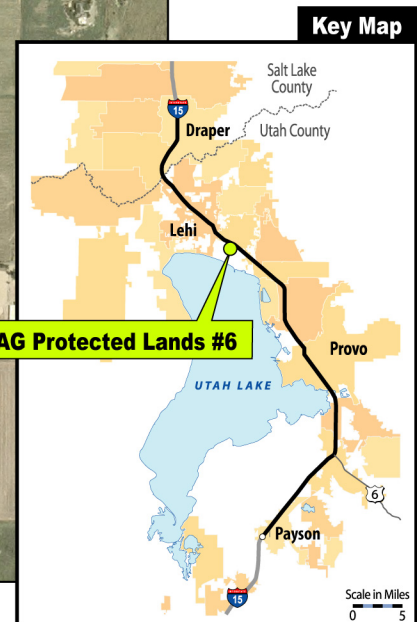
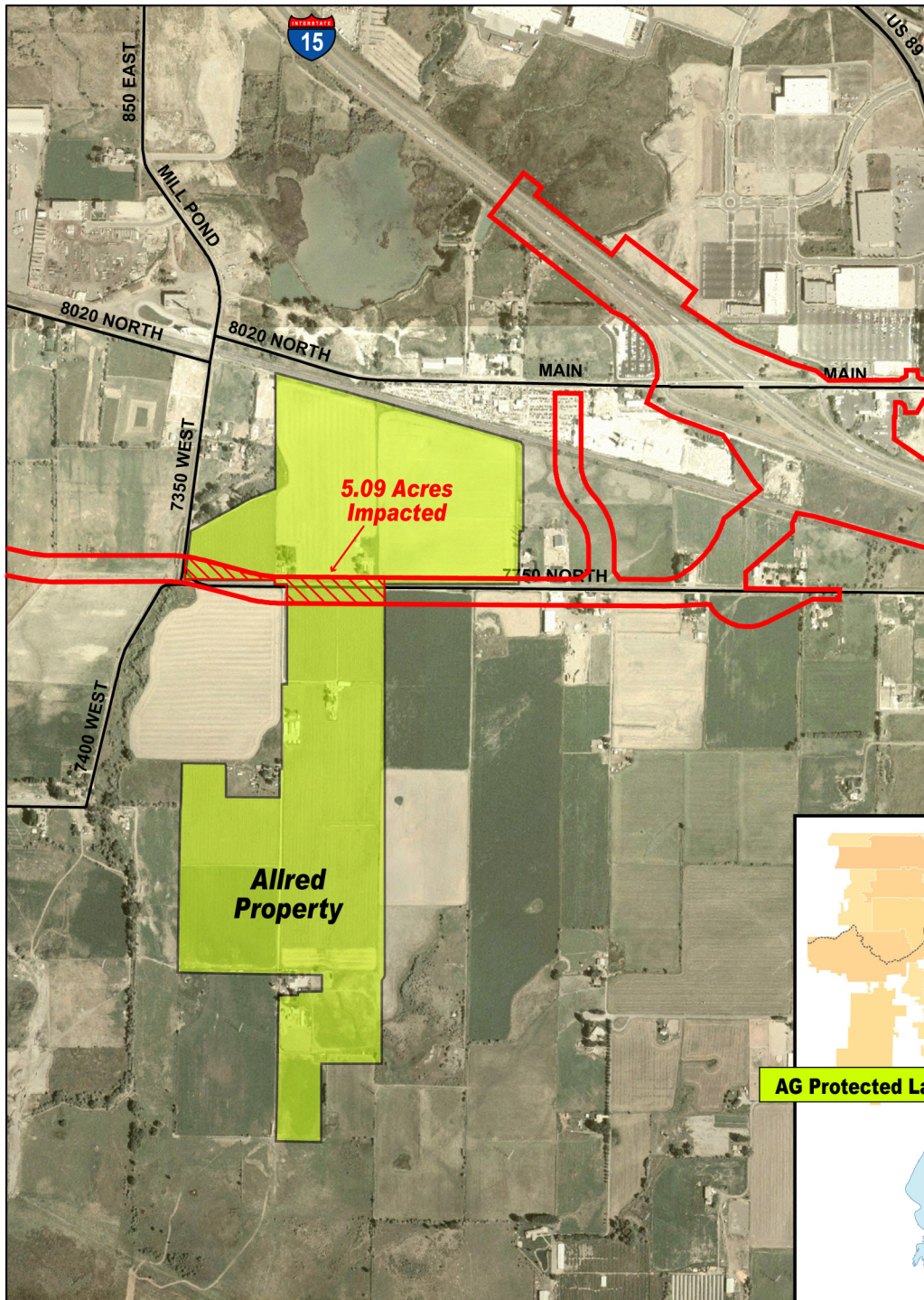


Alternative 4 Option A Area of Impact



Agricultural Protected Land





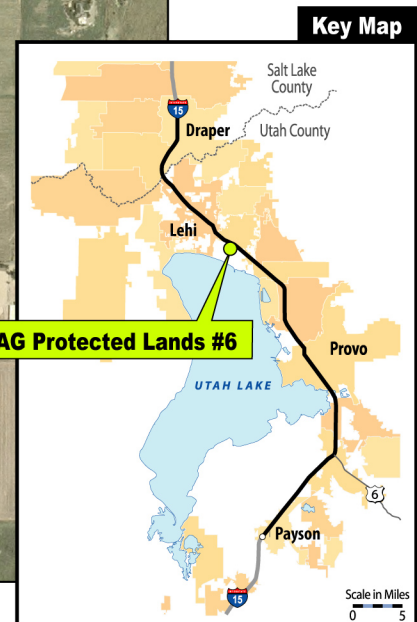
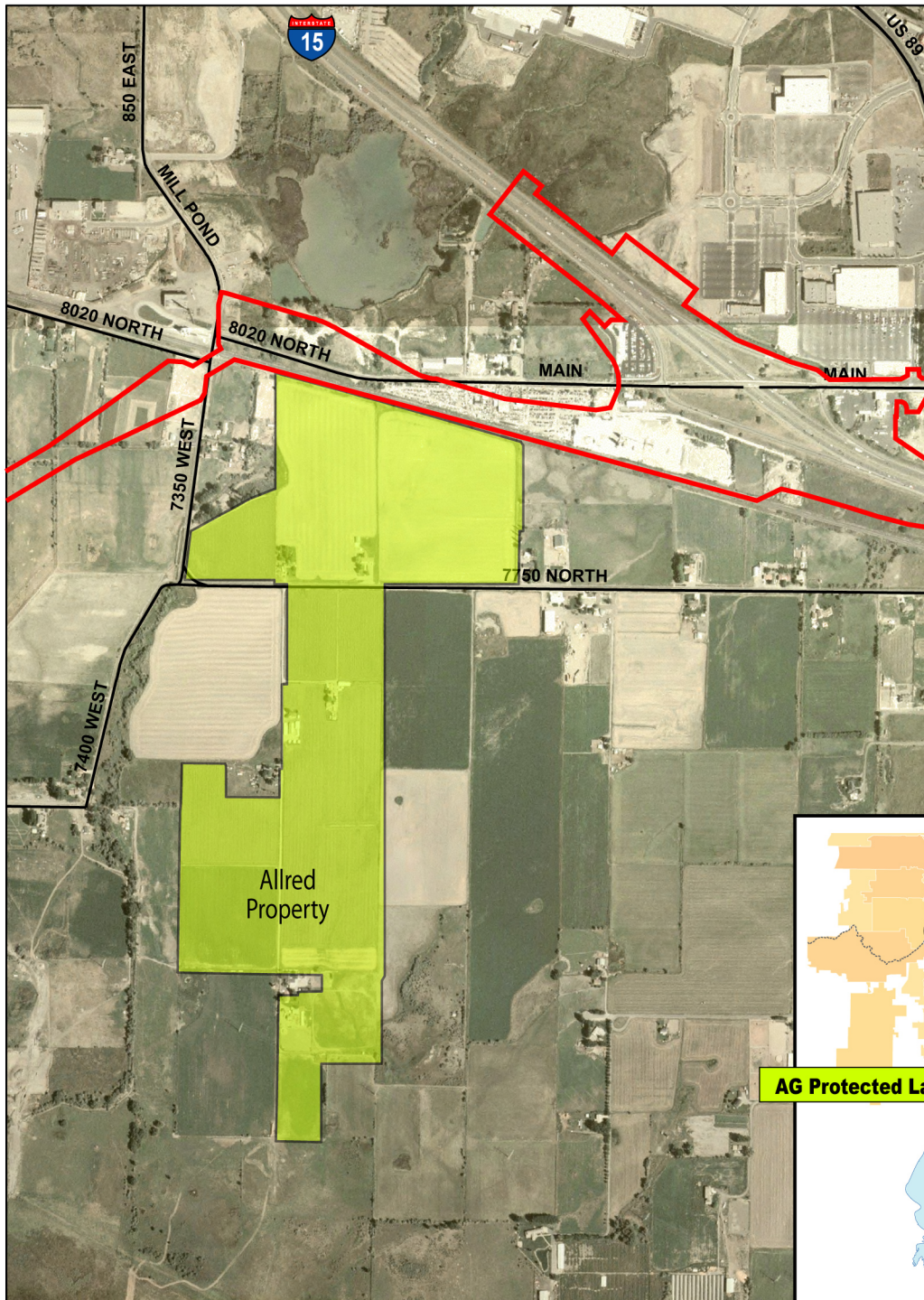
Scale in Miles
0 0.2 0.4

Figure 3.5-10
Agricultural Protection Areas & Impacts - American Fork - Option B

LEGEND:

- Alternative 4 Option B Area of Impact
- Agricultural Protected Land





Scale in Miles
0 0.2 0.4

Figure 3.5-11
Agricultural Protection Areas & Impacts - American Fork - Option C (Preferred)

LEGEND:

- Alternative 4 Option C Area of Impact
- Agricultural Protected Land



3.5.2.4 Indirect Impacts

A potential indirect impact on farmlands from Alternative 4 is the reduction in the role of agriculture and farming along the I-15 corridor. As more agricultural land is taken out of production through development and transportation projects, the impetus for remaining farm operations to continue would likely diminish. Options A and B in the Central Utah County section have greater potential to have indirect impacts on farmland and agricultural activity than Options C and D. These Options (A and B) remove more lands from production and that could contribute to a decline in the role of agriculture in Central Utah County. Likewise, Option B – South SPUI in the North Utah County section of Alternative 4 has greater potential to have indirect impacts on farmland and agricultural activity, and an Agricultural Protection Area, than either Option A – Diamond, or Option C – North SPUI. In Northern Utah County, Option B would remove more lands from production and this could contribute to a decline in the role of agriculture in the American Fork area.

3.5.3 Mitigation

No adverse impacts were identified under the Preferred Alternative, so mitigation is not proposed.

3.6 Economics

This section documents the economy of Utah and Salt Lake counties and the impacts of Alternatives 1 and 4 on the regional economy. Historic and expected future employment and historic unemployment rates are used as the indicators of the economy of this area.

Information for the description of the existing and expected economy was obtained from the Bureau of Economic and Business Research (BEBR), Economic Development Corporation of Utah (EDCUtah), Utah Governor's Office of Planning and Budget (GOPB), Utah Department of Workforce Services (UDWS), Mountainland Association of Governments (MAG), Mountainland Economic Development District (MEDD), and the Utah State Tax Commission.

The impacts of the project alternatives on the economy of Utah County and Salt Lake County were determined through the following analyses:

- Regional economic impacts;
- Business operations;
- Estimate of tax revenue lost due to conversion of private property to highway right-of-way; and
- Impacts of construction capital investment.

3.6.1 Affected Environment

The I-15 corridor is located within the Provo-Orem and Salt Lake City Metropolitan Statistical Areas (MSA). This U.S. Census designation reflects the social and economic integration of the region. As the most densely populated areas of the state, the Salt Lake-Ogden and Provo-Orem MSAs have the major share (80.7 percent) of all the jobs in the state (EDCUtah, 2006).

I-15 also plays an international economic role as it is a key NAFTA (North America Free Trade Agreement) corridor and CANAMEX Corridor, linking Canada, the United States and Mexico and providing an important corridor for national and international goods movement.

Employment in Utah and Salt Lake counties has grown substantially over the last several decades and dramatically since 1980. The civilian labor force in Utah County more than doubled between 1980 and 2006, and has remained steady throughout the 2000s, peaking to 202,005 in 2005 before decreasing in 2006 and 2007 to 171,719 (UDWS, 2007b). Non-farm jobs grew by nearly 5 percent between 2005 and 2006. Construction jobs have had the strongest job growth, increasing at a rate of 16 percent in 2006 (UDWS, 2007e).

In 2006, there were nearly 742,000 jobs in Utah and Salt Lake counties. The majority are in four sectors: Trade/Transportation/Utilities (TTU), Professional Services, Government, and Education and Health (EDCUtah, 2007a and EDCUtah, 2007b).

In Salt Lake County, in 2006 the civilian labor force increased 104 percent since 1980. The labor force has continued to grow steadily in the early 2000s (Utah Department of Workforce Services, 2007b). In 2006, non-farm jobs in Salt Lake County grew by nearly 4.5 percent from 2005 (Workforce News, 2006d).

Figure 3.6-1 and Figure 3.6-2 illustrate the growth in non-agricultural employment, by county. Jobs in the trade and service industries have increased dramatically over the last decade, while mining and manufacturing employment has begun to level off in both counties. Additionally, the construction sector saw an upsurge during the 1990s that has remained steady over the last 15 years (GOPB, 2005).

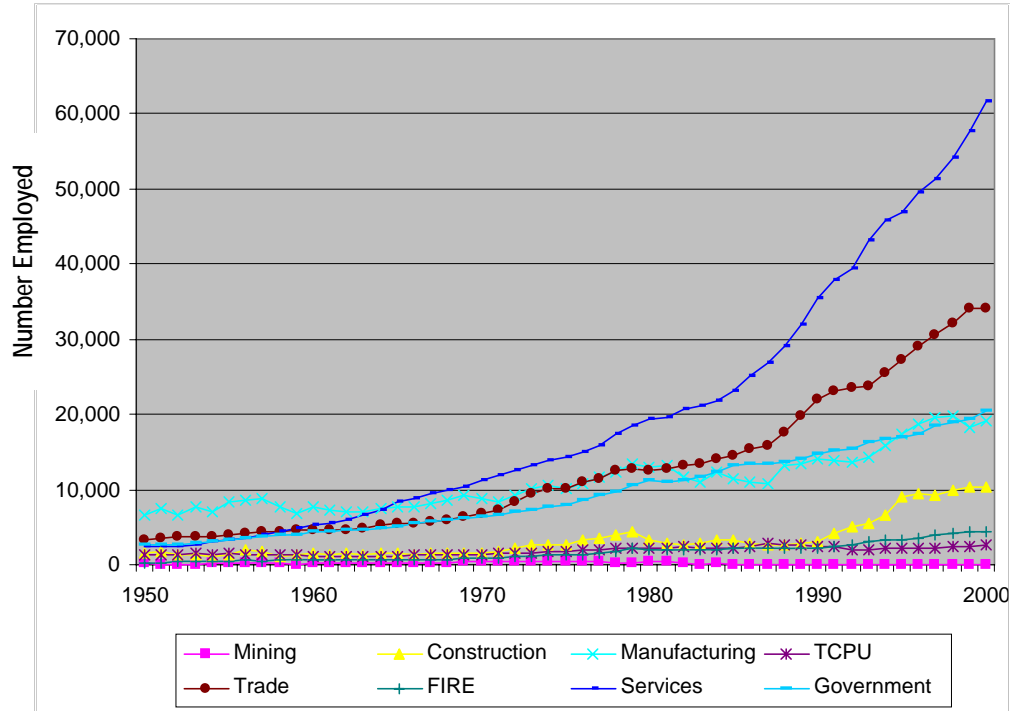
The GOPB develops estimates of employment growth into the future, by county. Figure 3.6-3 shows the expected growth in employment in both Utah and Salt Lake counties. The Utah Department of Workforce Services predicted that retail trade will continue to provide employment throughout the region, offering more job openings than any other occupation in the state between 2004 and 2014 (UDWS, 2005).

The strong economy is also reflected in the trend in unemployment rates since 1980. Figure 3.6-4 shows the general downward trend in unemployment rates historically. From a statewide peak unemployment rate of over 9% in the

early 1980's, unemployment rates have declined to about 4% in Utah County and 4.4% in Salt Lake County in 2005 (Utah Department of Workforce Services, Workforce Information, 2006a).

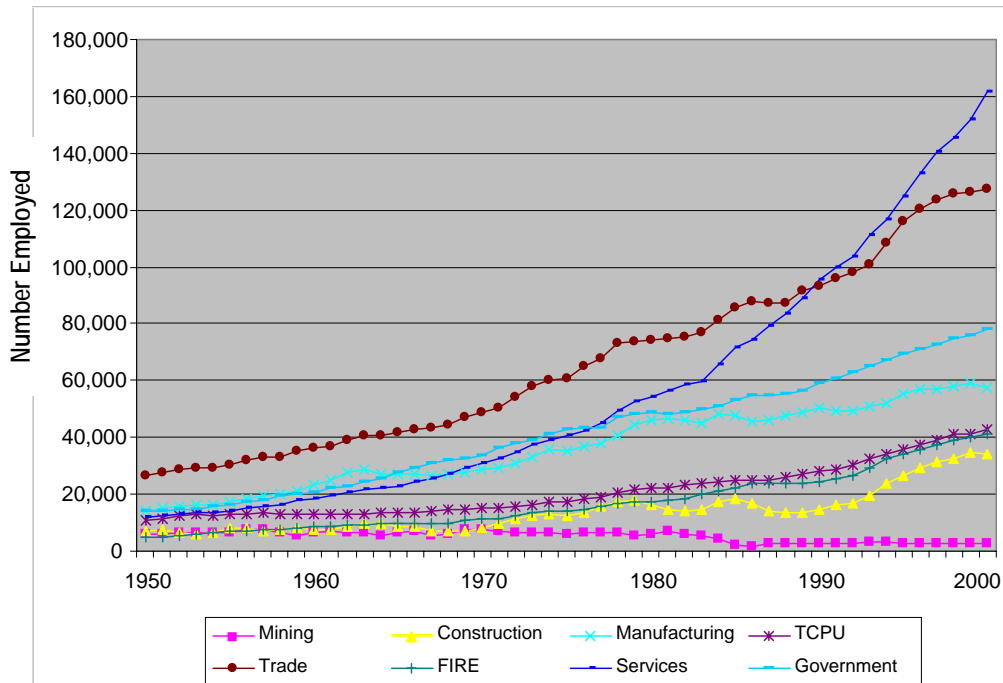
The expected growth in employment and the trend in unemployment are indicative of a positive regional economy.

Figure 3.6-1: Utah County Non-Agricultural Employment by Industry, 1950 – 2000



Source: (GOPB, 2005) TCPU – Transportation Communications and Utilities

Figure 3.6-2: Salt Lake County Non-Agricultural Employment by Industry, 1950 - 2000



Source: (GOPB, 2005) TCPU – Transportation Communications and Public Utilities

Employment, 2001-2030 Utah and Salt Lake Counties

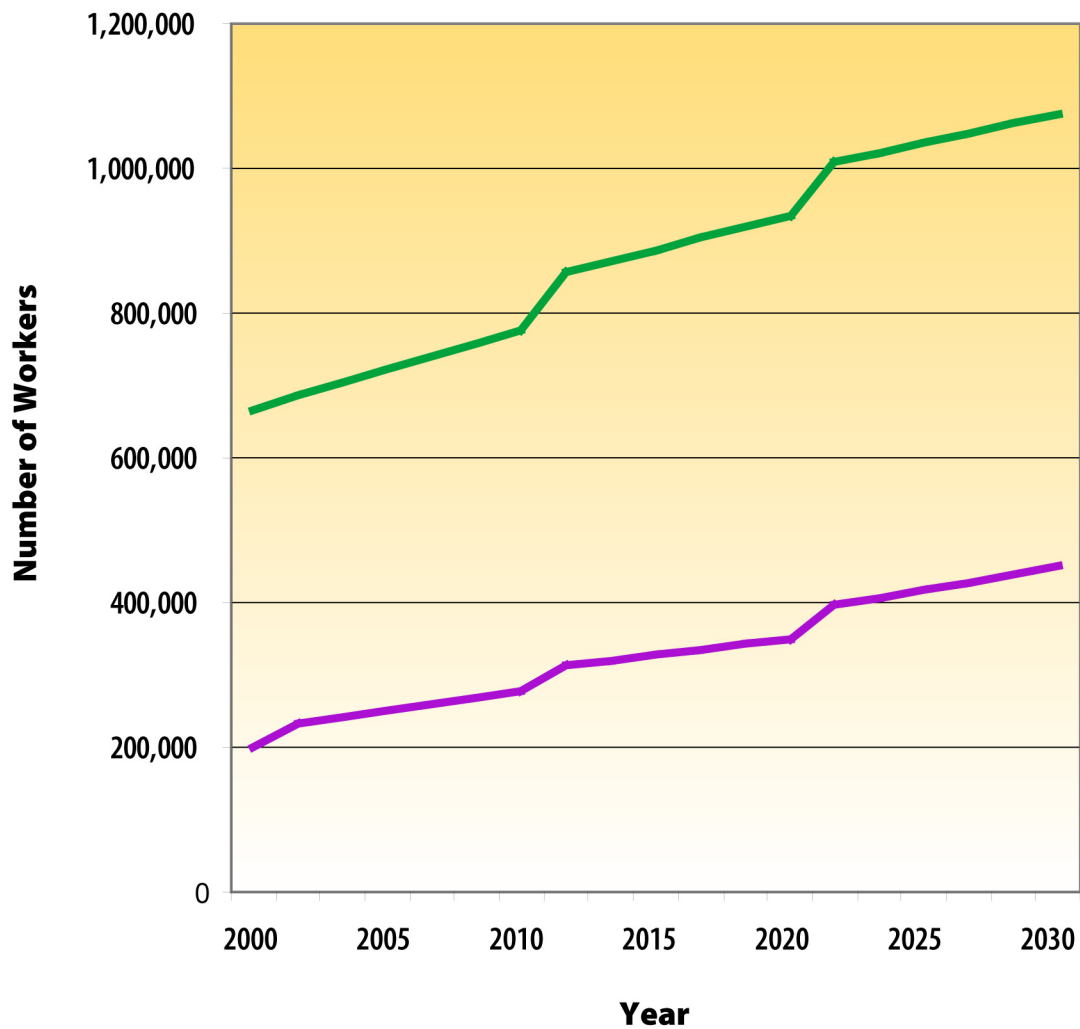


Figure 3.6-3
Employment, 2001 to 2030

LEGEND:

Source: Governor's Office of Planning and Budget

Salt Lake County Employment

Utah County Employment

Historic Unemployment Rate, 1980-2006 Utah and Salt Lake Counties

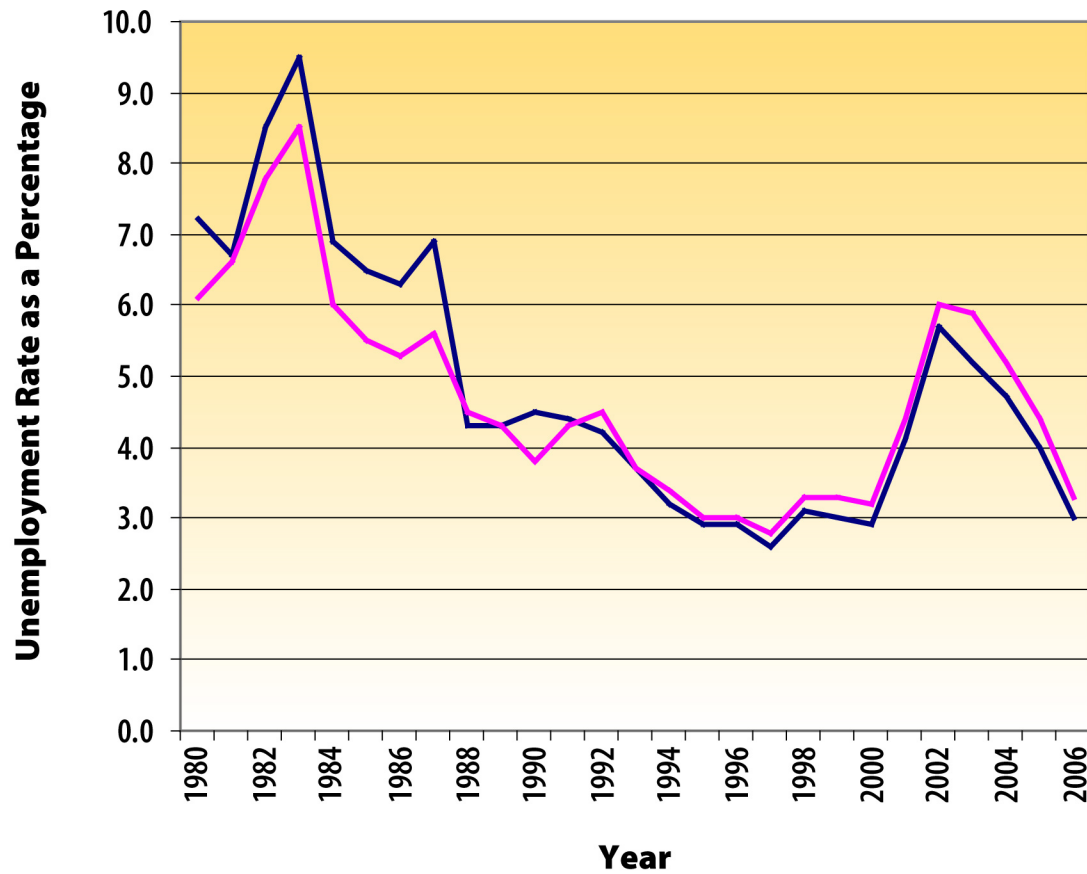


Figure 3.6-4
Historic Unemployment Rate, 1980-2006

LEGEND:

Source: Governor's Office of Planning and Budget

— Utah County Unemployment Rate

— Salt Lake County Unemployment Rate

3.6.2 Alternative 1: No Build

Although the current economic trends anticipated by the GOPB are likely to continue, Alternative 1 - No Build may eventually affect economic growth. As travel conditions on I-15 become more congested, businesses that use I-15 may be affected. Chapter 1 Purpose and Need documents expected traffic growth rates, a function of both population and employment growth in the study area. The transportation impacts of Alternative 1 are also described in Chapter 1. The decreasing LOS and increased delay manifested as peak period congestion may result in new businesses choosing to locate where there is better transportation mobility for their employees, suppliers and customers.

Employment trends and mix of industries and occupations would not change under Alternative 1, although the rate of employment growth may be reduced in response to transportation and mobility constraints. Other economic trends, including those for taxable sales, property values, housing trends, real estate transactions or residential rents would not be appreciably impacted by Alternative 1.

Employment centers and major businesses have likely located near the existing I-15 corridor for visibility, regional, statewide and national access to I-15 as the NAFTA and CANAMEX corridor, and employee and customer access. Substantial change to employment centers and major business locations under Alternative 1 are not expected to occur.

No right-of-way would be acquired under Alternative 1 therefore there would be no decrease in property tax revenues from Alternative 1.

As congestion worsens, the attractiveness of the I-15 corridor for new businesses may decline. The increase in traffic and congestion would also likely reduce the distance that commuters would be willing to travel to employment centers. Other areas not as dependent on the I-15 corridor may become more appealing for development, potentially focusing development elsewhere in the region and changing travel to employment patterns.

Alternative 1 would not be consistent with CANAMEX and NAFTA goals for I-15 as a national and international travel and goods movement corridor. Although the existing interstate would continue to provide the connectivity, Alternative 1 would result in higher levels of congestion and travel time delays.

3.6.3 Alternative 4: I-15 Widening and Reconstruction

The improved level of service, travel time and safety under Alternative 4 would provide the level of mobility in the I-15 corridor that would support the economic activity for Utah and Salt Lake counties projected by the GOPB. The Preferred Alternative is Alternative 4: Widening and Reconstruction, with Option C in the American Fork Main Street Interchange area, and Option D in the Provo/Orem area.

3.6.3.1 Regional Impacts

Alternative 4 would contribute to greater regional mobility between Utah and Salt Lake counties, as envisioned in the regional transportation plans. It would also service existing and planned development within the two counties and the cities through which I-15 passes. The additional mainline capacity and safety would be supportive of goods movement and support I-15's role as a NAFTA corridor and would help meet CANAMEX goals for the Utah section of the CANAMEX I-15 corridor. The reconstruction and widening would be consistent with and supportive of the economic activity envisioned by the GOPB.

3.6.3.2 Business Operations

At the macro level, Alternative 4 would generally improve overall business operations in the I-15 corridor by improving travel time on I-15, reducing freeway congestion, improving access to I-15 through reconstruction of existing interchanges, and improving safety. The addition of new interchanges at 800 South in Orem and at North

Lehi would provide interstate access to adjacent development and lands and potentially enhance the potential for additional business development, subject to local jurisdiction zoning and land use decision-making.

At the micro level, Alternative 4 would require the acquisition of a number of commercial properties and the businesses that occupy those properties. Table 3.4-1 entitled "Summary of Relocation Impacts" (see Section 3.4 Relocations of this chapter) summarizes the number of businesses that would be adversely impacted by Alternative 4 right-of-way acquisition. This would be an adverse impact to between 38 and 70 businesses (38 for the Preferred Alternative), although compensation would be in accordance with the Uniform Relocation and Real Property Acquisition Act of 1970, as amended. Relocation of these business establishments elsewhere within the I-15 corridor and/or within Utah County has the potential to keep these businesses operating and contributing to the local economy.

In addition to acquisition of commercial properties for Alternative 4, 55 existing billboards located on privately owned lands that would be acquired for the I-15 reconstruction would be displaced under Option A or B in the Central Utah County section. Under Options C or D (Preferred), 44 existing billboards would be displaced.

Within the context of the overall Utah County economy and numbers of business establishments, the potential loss of these businesses would not substantially impact the overall economy of the County.

In the Provo/Orem area, Options A and B may improve visibility of businesses that abut the frontage roads. As direct access to frontage roads would be restricted to maintain traffic flow, the economic benefit to these businesses would be minor.

3.6.3.3 Loss of Property Tax Revenue

Alternative 4 would require the purchase of additional right-of-way (ROW). When the purchase of land along the highway transfers ownership from private parties to a public entity, there is a net loss of tax revenue to Utah and Salt Lake counties. The majority of ROW requirements for Alternative 4 would be small portions of parcels adjacent to the existing highway. In many cases, this right-of-way can be acquired without adversely impacting property improvements, such as buildings and other structures. Nonetheless, acquisition of a portion of a parcel without impacting the property improvements may result in, not only a reduction in the assessed value of the parcel remainder, but in a reduction of the improvement's value by lowering its utility in the context of the smaller parcel size.

Using the conceptual engineering designs for Alternative 4 contained in Volume II of this EIS, the number and size of private party ROW purchases that would likely be required throughout the corridor was identified. The area impacted by Alternative 4 on each parcel was calculated and the impact designated as either a partial take or a full take.

The existing tax information for each affected parcel was obtained from the Utah County and Salt Lake County Assessor's Office on-line databases. The loss of tax revenue was estimated by calculating the area affected as a percentage of the total parcel area and using the resultant ratio to estimate the amount of tax revenue lost. For example, a property that would be 25% acquired and that currently pays \$2,400 in taxes would result in a loss of \$600 in tax revenue (0.25 times \$2,400 = \$600). The resultant estimates shown in Table 3.6-1 are for comparison purposes and are subject to change, based upon refinements to the area of impact during final design and right-of-way negotiations, and potential changes in property tax assessments.

As summarized in Table 3.6-1, the combined reduction in property tax from the conversion of private property to I-15 right-of-way would range from \$704,491 to \$783,100 per year.

Table 3.6-1: Estimated Loss of Property Taxes Revenue from Alternative 4

Geographic Section	Design Option	Property Tax Revenue Lost per year	Total Taxes Paid by Affected Properties per year
South Utah County	N/A	\$65,400	\$958,200
Central Utah County	A	\$232,800	\$1,145,700
	B	\$219,100	\$1,423,200
	C	\$181,700	\$1,375,400
	D*	\$177,500	\$1,212,200
Area common to all options		\$174,665	\$1,067,418
TOTAL Central Utah County		\$352,165 to \$407,465	\$2,279,618 to \$2,490,618
North Utah County			
American Fork Main Street	A	\$44,726	\$455,600
American Fork Main Street	B	\$47,825	\$288,487
American Fork Main Street	C*	\$68,035	\$340,796
North (common to all options)		\$211,400	\$1,611,000
TOTAL North Utah County		\$256,126 to \$279,435	\$1,899,487 to \$2,066,600
South Salt Lake County	N/A	\$30,800	\$836,000
		Total Property Taxes	\$5,973,305 to \$6,351,418
TOTAL TAX REVENUE LOST		\$704,491 to \$783,100	

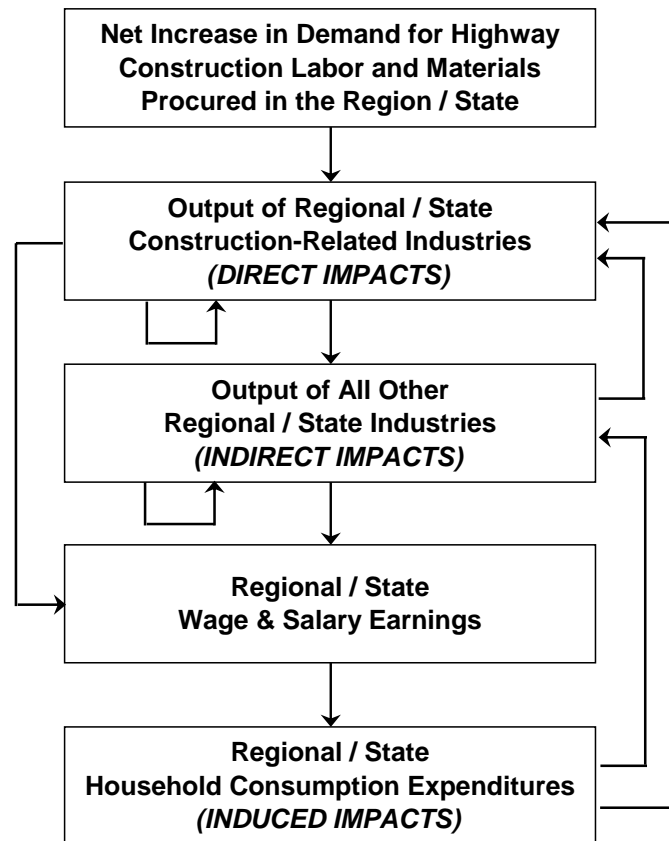
* Part of the Preferred Alternative

3.6.3.4 Impacts of Construction Capital Investment

Temporary local and/or statewide economic benefits would result from the construction capital investment in the I-15 reconstruction project. Construction and capital investment expenditures associated with highway construction would occur over several years, directly creating new demand for construction materials and jobs. To the extent that the direct labor and materials are procured from within the local economy or from within the state, they would lead to indirect or secondary impacts, as the production of output (goods and services) by firms in other industries increases to supply the demand for inputs to the construction industry. The direct and indirect impacts of construction expenditures cause firms in all industries to employ more workers to meet increases in demand. This leads to induced impacts as the additional wages and salaries paid to workers generate increased consumer spending in many economic sectors. In the context of economic evaluations, "induced" refers to the additional economic activity that is generated by the initial expenditure of construction funds.

The initial construction expenditures create a multiplied impact on the local and/or statewide economy in terms of overall economic activity/output, employment, and employment earnings. Figure 3.6-5 presents a flowchart that illustrates the multiplied indirect and induced impacts of direct expenditures on highway construction.

Figure 3.6-5: Construction Spending Multiplier Reactions



The multiplied impacts described above can be estimated using regional multipliers prepared by the Bureau of Economic Analysis (BEA) of the US Department of Commerce, as part of the national input-output accounts. Multipliers from the BEA's Regional Input-Output Modeling System (RIMS II) were obtained for Utah and Salt Lake counties and for the entire State of Utah.

3.6.3.5 Gross Economic Impacts of I-15 Improvement Expenditures

The expenditure of construction funds for the construction of Alternative 4 would have indirect and induced impacts on the regional economy.

Tables 3.6-2 and 3.6-3 present the gross multiplied economic (GME) impacts to Utah and Salt Lake counties from the I-15 construction expenditures. This analysis was conducted on the full 43-mile long corridor estimated capital costs. There are large differences between costs in the Provo/Orem area among Options A, B, C, and D. Options A and B include frontage roads, and Options C and D do not. For that reason, the GME analysis considers a high-cost option (Option A/B), and a low cost option (Option C/D). Using the least cost and highest cost options provides information on the range of benefits that would result from Alternative 4. The total approximate Alternative 4 costs of these options are \$3,278 million for Option A/B and \$3,068 million for Option C/D in fourth quarter 2006 dollars (Q4 2006\$).

Gross impacts from these expenditures include all dollar injections from federal and local sources that would still be spent on goods and services in the area, even if Alternative 4 were not constructed. This investment would create some impacts on the local and state economy.

Economic impacts are divided between funds expended for highway construction and related improvements, right-of-way acquisition, and costs of professional and technical expertise to engineer and manage the project. Utah and Salt

Lake counties are assumed to comprise the “local” economy, such that the majority of the direct expenditures is expected to be expended within these two counties, flowing to labor, material suppliers, and landowners. The remaining 10% is assumed to flow to other in-state sources. Specifically, any local contributions to the project funding would remain local. The two counties would likely still receive some of the state and federal dollars that would have been spent on I-15 via some other public investment if the I-15 project is not undertaken. Table 3.6-2 indicates that 90% of the \$3,068 million cost of Option C/D, or \$2,761 million would be initially expended within the local economy, generating a total gross impact of \$5,901 million in output, 52,697 person-year jobs, and \$1,777 million in associated employment earnings.

Table 3.6-2: GME Impacts of Construction of Option C or D on Utah and Salt Lake Counties

	Direct Expenditures for Highway Improvement Labor & Materials	% Flowing to Utah and Salt Lake Counties (Contributing to Impacts)	I-15 Project Impacts (Option C/D)			
			Direct Expenditures for Highway Improvement within Utah and Salt Lake Counties	Total Direct, Indirect & Induced Impact on Utah and Salt Lake Counties' Economic Output/Activity	Total Direct, Indirect & Induced Impact on Utah and Salt Lake Counties' Employment (all sectors)	Total Direct, Indirect & Induced Impact on Job Earnings in Utah and Salt Lake Counties (all sectors)
Construction Expenditures	\$2,407 M	90%	\$2,166 M	\$4,711 M	42,770 person-yr jobs	\$1,426 M
Engineering & Management	\$516 M	90%	\$464 M	\$998 M	8,975 person-yr jobs	\$327 M
Right-of-Way Expenditures	\$145 M	90%	\$131 M	\$193 M	953 person-yr jobs	\$24 M
Project Totals	\$3,068 M		\$2,761 M	\$5,901 M	52,697 person-yr jobs	\$1,777 M

Option A includes the frontage roads through Provo and Orem and is more expensive than Option C/D, Options A/B's economic impacts from the expenditure of construction funds are slightly higher and are shown in Table 3.6-3.

Table 3.6-3: GME Impacts of Construction of Option A or B on Utah and Salt Lake Counties

	Direct Expenditures for Highway Improvement Labor & Materials	% Flowing to Utah and Salt Lake Counties (Contributing to Impacts)	I-15 Project Impacts (Option A/B)			
			Direct Expenditures for Highway Improvement within Utah and Salt Lake Counties	Total Direct, Indirect & Induced Impact on Utah and Salt Lake Counties' Economic Output/Activity	Total Direct, Indirect & Induced Impact on Utah and Salt Lake Counties' Employment (all sectors)	Total Direct, Indirect & Induced Impact on Job Earnings in Utah and Salt Lake Counties (all sectors)
Construction Expenditures	\$2,573 M	90%	\$2,316 M	\$5,035 M	45,719 person-yr jobs	\$1,524 M
Engineering & Management	\$551 M	90%	\$496 M	\$1,066 M	9,584 person-yr jobs	\$349 M
Right-of-Way Expenditures	\$154 M	90%	\$139 M	\$205 M	1,012 person-yr jobs	\$26 M
Project Totals	\$3,278 M		\$2,950 M	\$6,306 M	56,315 person-yr jobs	\$1,899 M

Tables 3.6-4 and 3.6-5 present the gross multiplied economic impacts to the entire State of Utah from the I-15 construction expenditures of reconstruction Options C/D and A/B. Expenditures are again broken out by construction activities, right-of-way purchases and engineering and management costs. With the local economy expanded to include the entire state, 100% of the direct expenditures would likely flow to labor, material suppliers, and landowners located within Utah.

Table 3.6-4: GME Impacts of Construction of Option C or D on the State of Utah

	Direct Expenditures for Highway Improvement Labor & Materials	% Flowing to Utah (Contributing to Impacts)	I-15 Reconstruction Project Impacts (Option C/D)			
			Direct Expenditures for Highway Improvement within Utah	Total Direct, Indirect & Induced Impact on Utah Economic Output/Activity	Total Direct, Indirect & Induced Impact on Utah Employment (all sectors)	Total Direct, Indirect & Induced Impact on Job Earnings in Utah (all sectors)
Construction Expenditures	\$2,407 M	100%	\$2,407 M	\$5,655 M	56,757 person-yr jobs	\$1,884 M
Engineering & Management	\$516 M	100%	\$516 M	\$1,177 M	11,794 person-yr jobs	\$425 M
Right-of-Way Expenditures	\$145 M	100%	\$145 M	\$218 M	1,185 person-yr jobs	\$30 M
Project Totals	\$3,068 M		\$3,068 M	\$7,050 M	69,736 person-yr jobs	\$2,340 M

Table 3.6-4 indicates that the full \$3,068 million cost of Option C/D would generate a total gross impact of \$7,050 million in output, 63,736 person-year jobs, and \$2,340 million in associated employment earnings. Impacts associated with Option A/B are, again, slightly higher as shown in Table 3.6-5.

Table 3.6-5: GME Impacts of Construction of Option A or B on the State of Utah

	Direct Expenditures for Highway Improvement Labor & Materials	% Flowing to Utah (Contributing to Impacts)	I-15 Reconstruction Project Impacts (Option A/B)			
			Direct Expenditures for Highway Improvement within Utah	Total Direct, Indirect & Induced Impact on Utah Economic Output/Activity	Total Direct, Indirect & Induced Impact on Utah Employment (all sectors)	Total Direct, Indirect & Induced Impact on Job Earnings in Utah (all sectors)
Construction Expenditures	\$2,573 M	100%	\$2,573 M	\$6,045 M	60,671 person-yr jobs	\$2,014 M
Engineering & Management	\$551 M	100%	\$551 M	\$1,256 M	12,594 person-yr jobs	\$454 M
Right-of-Way Expenditures	\$154 M	100%	\$154 M	\$232 M	1,258 person-yr jobs	\$32 M
Project Totals	\$3,278 M		\$3,278 M	\$7,533 M	74,523 person-yr jobs	\$2,501 M

Table 3.6-6 shows a summary of the ranges of benefits that would accrue from the construction of Alternative 4.

Table 3.6-6: Range of Gross Multiplied Economic Impacts of Construction of Alternative 4

I-15 Reconstruction Project Impacts (total cost)	Lowest* (\$3,068 Million)	Highest** (\$3,278 Million)
Impact on Utah and Salt Lake Counties		
Direct Expenditures for Highway Improvement	\$2,761 M	\$2,950 M
Total Direct, Indirect & Induced Impact	\$5,901 M	\$6,306 M
Total Direct, Indirect & Induced Impact	52,697 person-yr jobs	56,315 person-yr jobs
Total Direct, Indirect & Induced Impact on Job Earnings	\$1,777 M	\$1,899 M
Impact on the State of Utah		
Direct Expenditures for Highway Improvement	\$3,068 M	\$3,278 M
Total Direct, Indirect & Induced Impact	\$7,050 M	\$7,533 M
Total Direct, Indirect & Induced Impact	69,736 person-yr jobs	74,523 person-yr jobs
Total Direct, Indirect & Induced Impact on Job Earnings	\$2,340 M	\$2,501 M

* With Option C/D in the Central Utah County Section.

** With Option A/B in the Central Utah County Section.

3.6.3.6 Indirect Impacts

The indirect impacts of Alternative 4 on the economy consist of the job creation and additional expenditures during the construction period. These are summarized in Table 3.6-6 above.

3.7 Noise

The existing noise environment along the I-15 corridor and the impacts of Alternatives 1 and 4 on noise sensitive land uses are described in this section. Since publication of the DEIS, UDOT updated its Noise Policy, including the Noise Abatement Criteria (January 15, 2008). The new policy has been approved by the FHWA, and is used throughout the FEIS. Noise impacts were re-analyzed according to the new traffic model and Noise Abatement Policy, which may create slight changes to the mitigation described in the DEIS.

The Preferred Alternative is Alternative 4: I-15 Widening and Reconstruction, with American Fork Option C and in Provo/Orem area Option D. Option D includes a re-alignment of Provo 820 North, as described in Options A and B in the DEIS.

3.7.1 *Affected Environment*

The characteristics of noise, noise level descriptors, noise regulations, noise impact criteria, and existing noise levels along the I-15 corridor are described in this section.

3.7.1.1 Characteristics of Noise

Sound is defined as vibrations transmitted through the air or other medium as perceived by sense of hearing. *Noise* is defined as sound that is loud, unpleasant, unexpected, or undesired.

Sound consists of three components: the sound source, the sound path, and the sound receiver. All three components must be present for sound to exist. Without a source to produce sound, there is no sound. Likewise, without a medium to transmit sound pressure waves, there is also no sound. And finally, sound must be received—a hearing organ, sensor, or object must be present to perceive, register, or be affected by sound or noise.

A continuous sound can be described by its *frequency* (pitch) and its *amplitude* (loudness). Frequency relates to the number of pressure oscillations per second. Low-frequency sounds are low in pitch, like the low notes on a piano, whereas high-frequency sounds are high in pitch, like the high notes on a piano.

The *amplitude* of a sound determines its loudness. Loudness of sound increases and decreases with increasing and decreasing amplitude.

Sound pressure level alone is not a reliable indicator of loudness. The frequency, or pitch, of a sound also has a substantial effect on how humans will respond. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

The A-scale weighting network approximates the frequency response of the average young ear when listening to most ordinary, everyday sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. In environmental noise studies, A-weighted sound pressure levels are commonly referred to as noise levels. Table 3.7-1 shows typical A-weighted noise levels.

Table 3.7-1: Weighted Noise Levels and Human Response

Sound Source	Noise Level dBA*	Response Descriptor
Carrier deck jet operation	140	Limit of amplified speech
	130	Painfully loud
Jet takeoff (200 feet)	120	Threshold of feeling and pain
Auto horn (3 feet)		
Riveting machine	110	
Shout (0.5 foot)	100	Very annoying
New York subway station		
Heavy truck (50 feet)	90	Hearing damage (8-hour exposure)
Pneumatic drill		
Passenger train (100 feet)	80	Annoying
Helicopter (in-flight, 500 feet)		
Freight train (50 feet)		
Freeway traffic (50 feet)	70	Intrusive
Air conditioning unit	60	
Light auto traffic (50 feet)		
Normal speech (15 feet)	50	Quiet
Living room, bedroom, library	40	
Soft whisper (15 feet)	30	Very quiet
Broadcasting studio	20	
	10	Just audible
	0	Threshold of hearing

*Typical A-weighted noise levels taken with a sound-level meter and expressed as decibels on the "A" scale. The "A" scale approximates the frequency response of the human ear.

Source: CEQ, 1970.

3.7.1.2 Noise-Level Descriptors

Noise in our daily environment fluctuates over time. Some of the fluctuations are minor and some are substantial. Some noise levels occur in regular patterns, others are random. Some noise levels fluctuate rapidly, others slowly. Some noise levels vary widely, others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following is a discussion of the noise descriptors most commonly used in traffic noise analysis.

Equivalent Sound Level (Leq) - The equivalent sound level (Leq) represents an average of the sound energy occurring over a specified period. Leq is, in effect, the steady-state sound level that, in a stated period, would contain the same acoustical energy as the time-varying sound that actually occurs during the same period. The one-hour A-weighted equivalent sound level, Leq(h), is the energy average of the A-weighted sound levels occurring during a one-hour period and is the basis for noise abatement criteria (NAC) used by the Department and the FHWA.

Maximum Sound Level (Lmax) - The maximum sound level (Lmax) is the highest instantaneous sound level measured during a specified period.

3.7.1.3 Noise Regulations and Impact Criteria

The United States Code of Federal Regulations Part 772 (23 CFR 772), "Procedures for Abatement of Highway Traffic Noise and Construction Noise", establishes standards for mitigating highway traffic noise. 23 CFR 772 defines the FHWA criteria used to assess noise impacts. The Noise Abatement Criteria (NAC) contained in this regulation have been adopted by UDOT and contained in UDOT's Noise Abatement Policy.

Table 3.7-2 summarizes these criteria. As defined by UDOT's Noise Abatement Policy, a traffic noise impact occurs when a predicted traffic noise level is equal to or greater than the NAC in Table 3.7-2 for the corresponding land use category. A traffic noise impact is also considered to occur when the predicted traffic noise level substantially exceeds the existing noise level, even if the noise levels are below the NAC. A 10 dBA increase over existing noise levels is defined by UDOT as a substantial exceedance.

Table 3.7-2: Noise Abatement Criteria

Activity Category	Leq Noise Levels (dBA)	Description of Activity Category
A	56 (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	66 (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals
C	71 (exterior)	Developed lands, properties or activities not included in Categories A or B above
D	----	Undeveloped lands
E	51 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Source: USDOT, "Highway Traffic Noise Analysis and Abatement Policy and Guidance", 1995.

3.7.2 Existing Noise Levels

Surveys of the existing land uses along the project corridor were used to identify Category B land uses (residential and recreational properties) that would be sensitive to traffic noise. Thirty-five sites, which represent approximately 910 residences, were chosen as representative of noise-sensitive locations. Existing noise measurements were taken at these 35 sites. Twenty-eight short-term (10- to 20-minute) and seven long-term (24-hour) measurements were taken at these 35 sites. All but one are at residential properties; one is at a park.

The 35 measurement sites were supplemented with the selection of 65 additional modeling sites for use in the FHWA Traffic Noise Model (TNM). The TNM 2.5 models were verified using the actual short-term measurements and traffic counts taken at the time of the measurement. The validated models were then run with the existing peak hour traffic numbers to calculate the modeled peak hour noise level.

Table 3.7-3 summarizes the results of the determination of existing peak hour noise levels. Column 1 specifies the number assigned to each receiver. The numbered receiver designations correspond to the modeled sites within the study area. The receivers designated by a letter (or letters) of the alphabet correspond to short-term measurement sites and twenty-four-hour measurement sites. The address of each receiver site is shown in Column 2. Column 3 indicates the measurement type for each receiver – either short-term measurement, long-term measurement, or modeled. Column 4 lists the modeled peak-hour noise levels for all of the receivers, which will be used in the comparison of existing levels with projected noise levels that would result from the construction of the proposed project.

The locations of the receiver sites are illustrated on Figures 3.7-1 through 3.7-6. Following these figures, the existing peak hour noise levels are described for each project section.

Table 3.7-3: Existing Noise Levels

Note: Levels listed in bold indicate noise impacts as defined in UDOT's Noise Abatement Policy

Receiver #	Address	Measurement Type	Peak Noise Level Leq(h) (dBA)
South Utah County			
1	Residence – 1050 West 550 South Payson	Modeled	70
B	Residence -1028 West 450 South, Payson	Short-Term	69
2	Residence – on 900 West, Payson	Modeled	70
3	Residence – on 200 South, Payson	Modeled	68
4	Residence – on 100 South, Payson	Modeled	66
5	Residence – on 100 North, Payson	Modeled	66
6	Residence – on 300 North, Payson	Modeled	63
7	Residence – at the intersection of 600 West and 300 North, Payson	Modeled	66
A	Residence -400 North 630 West, Payson	24-Hour	63
8	Residence – between 300 North and 400 North, Payson	Modeled	65
9	Residence – on 500 West, Payson	Modeled	64
D	Residence -475 Nebeker Lane, Payson	Short-Term	70
10	Residence – on 500 West, Payson	Modeled	62
11	Residence – on 300 West, Payson	Modeled	72
E	Residence -1952 West 7300 South, Spanish Fork	Short-Term	70
12	Residence – on 6930 South, Spanish Fork	Modeled	65
F	Residence -6832 Larsen Road, Spanish Fork	Short-Term	66
G	Residence -254 North 920 West, Spanish Fork	Short-Term	65
13	Residence – on 350 North, Spanish Fork	Modeled	62
14	Residence – on 500 North, Spanish Fork	Modeled	74

Table 3.7-3: Existing Noise Levels – continued

Note: Levels listed in bold indicate noise impacts as defined in UDOT's Noise Abatement Policy

Receiver #	Address	Measurement Type	Peak Noise Level Leq(h) (dBA)
South Utah County continued			
C	Residence -541 Mitchell Drive, Spanish Fork	24-Hour	74
15	Residence – on Mitchell Drive, Spanish Fork, between 600 North and 700 North	Modeled	73
16	Residence – on 900 North, Spanish Fork	Modeled	65
Central Utah County			
I	301 Lakewood Drive, Provo	Short-Term	64
17	Residence – on 300 West, Provo	Modeled	64
18	Residence/Park – on 400 west, Provo	Modeled	66
19	Residence – at intersection of 1150 South and South Frontage Road, Provo	Modeled	63
20	Residence – on South Frontage Road, Provo	Modeled	63
21	Residence – at intersection of 500 West and 1200 South, Provo	Modeled	64
22	Residence – at intersection of 600 West and 1020 South, Provo	Modeled	63
J	Residence -792 and 796 West 1020 South, Provo	Short-Term	63
H	Residence -880 58 Stubbs Avenue, Provo	24-Hour	76
23	Residence – at intersection of Stubbs Avenue and Heather Lane, Provo	Modeled	62
24	Residence – on 770 South, Provo	Modeled	62
25	Residence – on 1100 West, Provo	Modeled	62
26	Residence – at intersection of 600 South and 950 West, Provo	Modeled	64
27	Residence – on 600 South, Provo	Modeled	63
28	Residence – at intersection of 430 South and 1220 West, Provo	Modeled	65
K	Residence -126 1470 West, Provo	Short-Term	63
29	Residence – at intersection of 50 North and 1600 West, Provo	Modeled	63

Table 3.7-3: Existing Noise Levels – continued

Note: Levels listed in bold indicate noise impacts as defined in UDOT's Noise Abatement Policy

Receiver #	Address	Receiver Type	Peak Noise Level Leq(h) (dBA)
Central Utah County – continued			
30	Residence – at intersection of 150 North and 1600 West, Provo	Modeled	64
L	Unit 88 of the Lamplighter Mobile Estates, Provo	Short-Term	64
M	Unit 28 of the Mobile Home Estates on Geneva Road, Provo	Short-Term	68
31	Residence – on Geneva Road, Provo	Modeled	67
N	Residence -1134 Independence Avenue, Provo	Short-Term	65
32	Residence – on Lakeview Drive, Provo	Modeled	74
O	Residence -2367 West 220 South, Provo	24-Hour	78
R	Residence -1756 Sandhill, Orem	Short-Term	65
33	Residence – at intersection of 1200 West and 680 South, Orem	Modeled	64
33A	696 South 1035 West, Orem	Short-Term	53
S	Courtside Place Condominiums, Orem	Short-Term	74
34	Residence – at intersection of 400 South and 1200 West, Orem	Modeled	75
35	Residence – on 1200 West, Orem	Modeled	72
P	Newport Village Condominiums, Orem	24-Hour	74
36	Apartments – on 1380 North, Orem	Modeled	66
T	Residence -1446 North 1300 West, Orem	Short-Term	68
37	Apartments – on 1335 West, Orem	Modeled	75
North Utah County			
U	Residence -620 South 330 East, American Fork	Short-Term	75
38	Residence – at intersection of 5750 West and 500 South, American Fork	Modeled	70
39	Residence – at intersection of Center Street and 400 South, American Fork	Modeled	76
V	Residence -279 South 100 West, American Fork	Short-Term	77

Table 3.7-3: Existing Noise Levels – continued

Note: Levels listed in bold indicate noise impacts as defined in UDOT's Noise Abatement Policy

Receiver #	Address	Receiver Type	Peak Noise Level Leq(h) (dBA)
North Utah County - continued			
40	Residence – at intersection of 200 West and 200 South, American Fork	Modeled	74
W	Residence -2839 Barratt Circle, American Fork	Short-Term	63
Q	Lions Park, American Fork	24-Hour	68
41	Residence – on Chadwick Circle, American Fork	Modeled	66
42	Residence – at intersection of 200 South and 300 West, American Fork	Modeled	69
43	Residence – at north end of Mahogany Drive	Modeled	74
AF-1	1100 West Main Street, American Fork	Short-Term	66
AF-2	7941 7340 West, American Fork	Short-Term	56
AF-3	6785 West 200 South, American Fork	Short-Term	59
AF-4	Two Residences North of West 7750 North, American Fork	Modeled	55
AF-5	Residence – South of West 7550 North, American Fork	Modeled	56
AF-6	Residence – North of West 7550 North, American Fork	Modeled	55
AF-7	Residence – North of West 7550 North, American Fork	Modeled	46
AF-8	New Homes – South of West 7550 North on Gray Goose Road, American Fork	Modeled	65
44	Residence – on 900 East between State Street and 500 North, Lehi	Modeled	65
Y	Residence -750 East 500 North, Lehi	Short-Term	68
45	Residence – on 625 East, Lehi	Modeled	74
Z	Residence -825 North 400 East, Lehi	Short-Term	71
46	Residence – on Frontage Road, Lehi between 900 North and 200 East	Modeled	67
47	Residence – on Frontage Road, Lehi between 200 East and Shelton Ave	Modeled	67
48	Residence – at Trailer Park, South 1200 North, Lehi	Modeled	72

Table 3.7-3: Existing Noise Levels – continued

Note: Levels listed in bold indicate noise impacts as defined in UDOT's Noise Abatement Policy

Receiver #	Address	Receiver Type	Modeled Peak Noise Hour Level (dBA)
North Utah County - continued			
49	Residence – on Frontage Road, Lehi between Shelton Ave and Cedar Hollow Rd	Modeled	75
50	Residence – on 1200 North, Lehi	Modeled	68
X	Residence -1326 Cedar Hollow Drive, Lehi	24-Hour	68
51	Residence – at intersection of Frontage Road and 250 West, Lehi	Modeled	67
AA	Lot 17 of Hansen Community Mobile Homes, 1235 North 300 West, Lehi	Short-Term	63
52	Residence – at intersection of Frontage Road and 500 West, Lehi	Modeled	67
53	Lot 24 of Hansen Community Mobile Homes, 1235 North 300 West, Lehi	Modeled	61
54	Residence – at intersection of Frontage Road and 600 West, Lehi	Modeled	69
55	Residence – on 600 West, Lehi	Modeled	61
56	Residence – on Railroad Street	Modeled	72
BB	Brookestone Apartments, 900 West 2100 North, Lehi	Short-Term	73
57	Residence – on State Street, Lehi	Modeled	71
CC	Residence -2140 N State Street, Lehi	Short-Term	70
58	Residence – on 2100 North, Lehi	Modeled	68
South Salt Lake County			
59	Residence – on Minuteman Drive, Draper - between Bangerter Highway and 13275 South	Modeled	72
EE	Pinnacle Reserve Apartments, 13343 Minuteman Drive, Draper	Short-Term	73
60	Residence – on Pony Express Drive, Draper - between Bangerter Highway and Golden Harvest Road	Modeled	72
FF	Residence -12712 Pony Express Road, Draper	Short-Term	74

3.7.2.1 South Utah County Section

The South Utah County section includes the towns of Payson and Spanish Fork. The land use within the towns is a mix of commercial uses and single-family homes. Outside the towns the land use is mostly open farm land with scattered single-family homes. Measurements were taken at two 24-hour receivers (receivers A and C) and five short-term receivers (receivers B, D, E, F, and G). Their locations are shown on Figures 3.7-1 and 3.7-2. Homes closer to or more exposed to I-15 would have higher noise levels than homes that are further away or protected by some form of shielding such as other buildings or walls. The peak hour measured noise levels range from 63 to 74 dBA. Sixteen additional sites were modeled in the TNM model to supplement the measured sites. Using existing peak hour traffic, the modeled existing peak hour noise levels range from 62 to 74 dBA. The NAC (66 dBA) is reached or exceeded at 14 of the 23 measured and modeled sites.

3.7.2.2 Central Utah County Section

The Central Utah County section includes the towns of Provo, Orem and parts of Lindon. The land use in the area is a mix of open space, commercial and single- and multi-family land uses. Measurements were taken at three 24-hour receivers (receivers H, O and P) and ten short-term receivers (I, J, K, L, M, N, R, 33A, S, T). Their locations are shown in Figures 3.7-3 and 3.7-4. The peak hour measured noise levels range from 55 to 75 dBA. The homes close or more exposed to I-15 would have the higher noise level, than the homes further away or with some shielding, building or walls, from I-15. Twenty-one additional sites were modeled in the TNM model to supplement the measured sites. Using existing peak hour traffic, the modeled existing peak hour noise levels range from 62 to 78 dBA. The NAC (66 dBA) is reached or exceeded at 13 of the 34 measured and modeled sites.

3.7.2.3 North Utah County Section

The North Utah County section includes parts of Lindon and through Pleasant Grove, American Fork and Lehi. Outside of the towns of American Fork and Lehi, the land use is a mix of mostly open farm land with some commercial and industrial uses. Land uses within American Fork and Lehi are a mix of commercial, industrial and single-and multi-family homes.

Measurements were taken at two 24-hour receivers (receivers Q and X) and 11 short-term receivers (U, V, W, AF-1, AF-2, AF-3, Y, Z, AA, BB, CC). The receiver locations are shown in Figure 3.7-5. The peak hour measured noise levels range from 59 to 77 dBA. Homes closer to or more exposed to I-15 would have higher noise levels than homes that are further away or protected by some form of shielding such as other buildings or walls. Twenty-six additional sites were modeled in TNM to supplement the measured sites. Using existing peak hour traffic, the modeled existing peak hour noise levels range from 46 to 76 dBA. The NAC (66 dBA) is reached or exceeded at 27 of the 39 measured and modeled sites.

3.7.2.4 South Salt Lake County Section

The South Salt Lake County section includes the towns of Bluffdale and Draper. Outside Draper, the land uses are generally undeveloped or are part of active sand and gravel extraction quarry. Land uses within Draper are a mix of commercial, industrial and single-and multi-family homes.

Measurements were taken at two short-term receivers (receivers EE and FF). Their locations are shown in Figure 3.7-6. The peak hour measured noise levels range from 73 to 74 dBA. Homes closer to or more exposed to I-15 would have higher noise levels than homes that are further away or protected by some form of shielding such as other buildings or walls. Two additional sites were modeled in TNM to supplement the measured sites. Using existing peak hour traffic, the modeled existing peak hour noise levels were 72 dBA. The NAC (66 dBA) is reached or exceeded at all four measured and modeled sites.

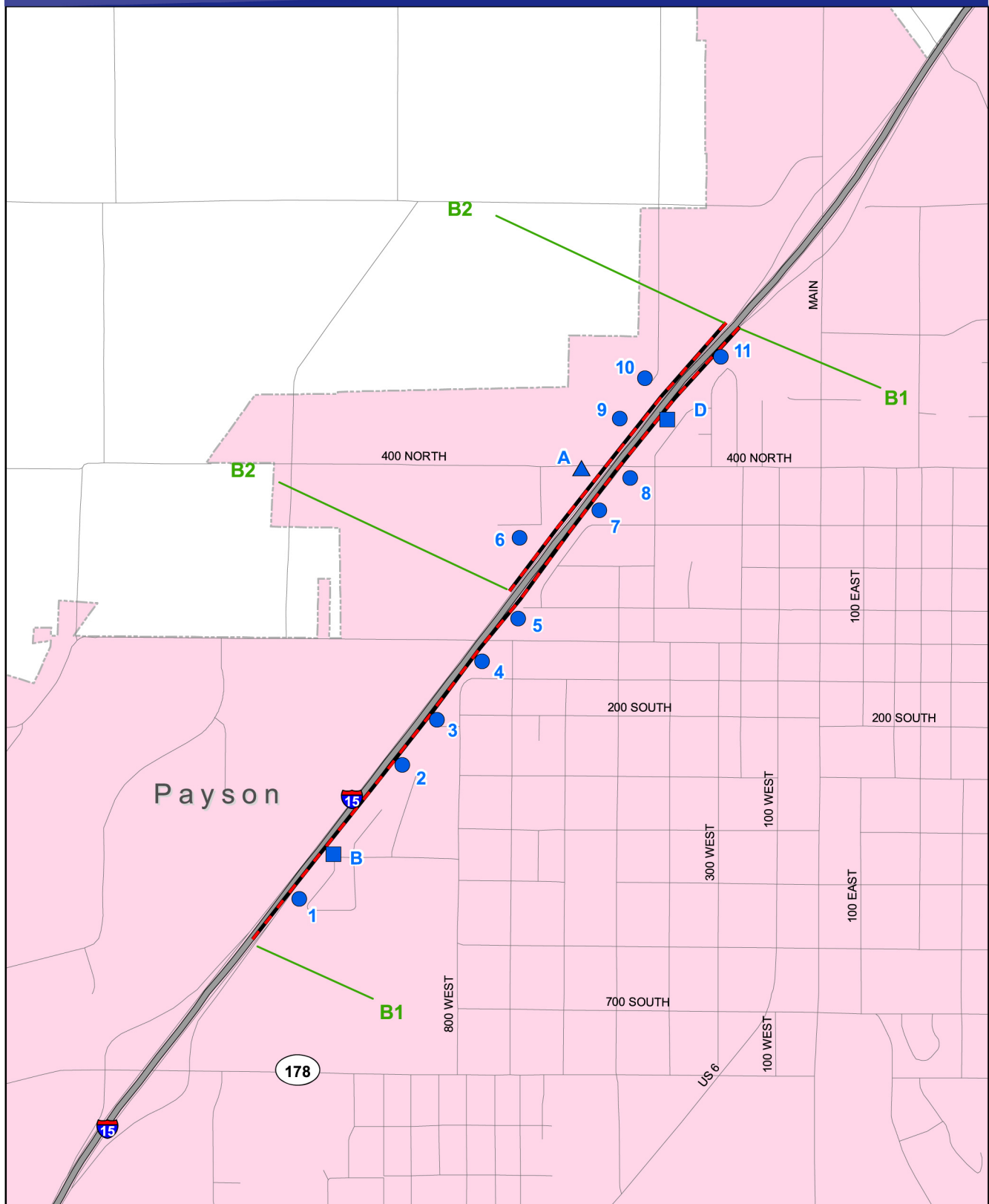
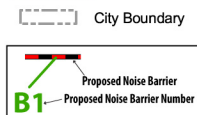


Figure 3.7-1

Receivers and Proposed Noise Barriers

LEGEND



Receiver Type

- ▲ 24-Hour Measurement
- Short-Term Measurement
- Modeled Site



Basemap Sources: Salt Lake County, Utah County, and Utah's Statewide Geographic Information Database (SGID)



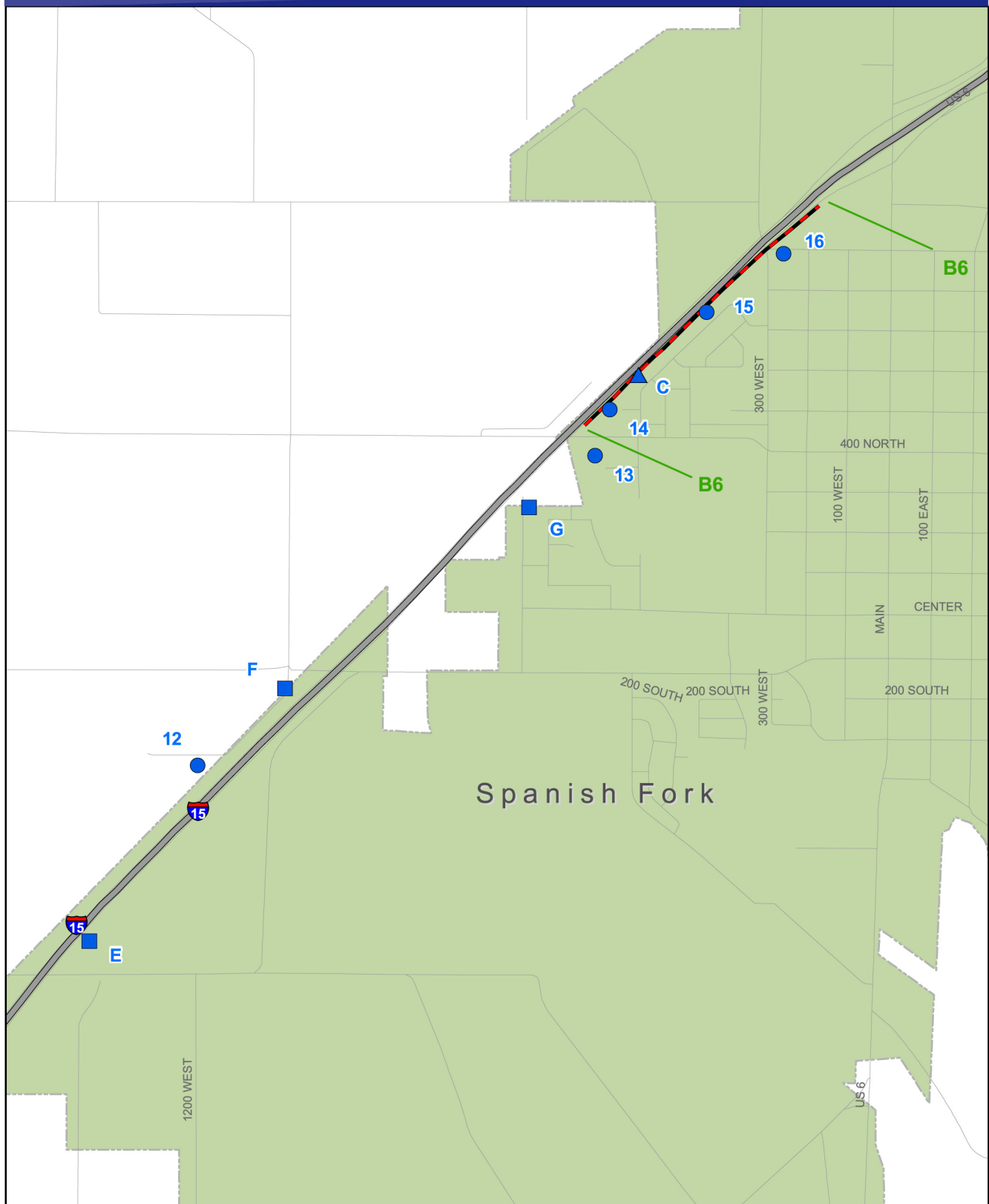
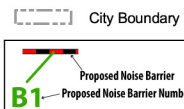


Figure 3.7-2
Receivers and Proposed Noise Barriers

LEGEND



Receiver Type

- ▲ 24-Hour Measurement
- Short-Term Measurement
- Modeled Site



Basemap Sources: Salt Lake County, Utah
County, and Utah's Statewide
Geographic Information Database (SGID)

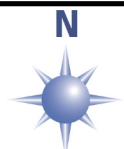
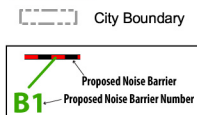




Figure 3.7-3

Receivers and Proposed Noise Barriers

LEGEND

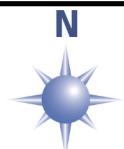


Receiver Type

- ▲ 24-Hour Measurement
- Short-Term Measurement
- Modeled Site



Basemap Sources: Salt Lake County, Utah County, and Utah's Statewide Geographic Information Database (SGID)



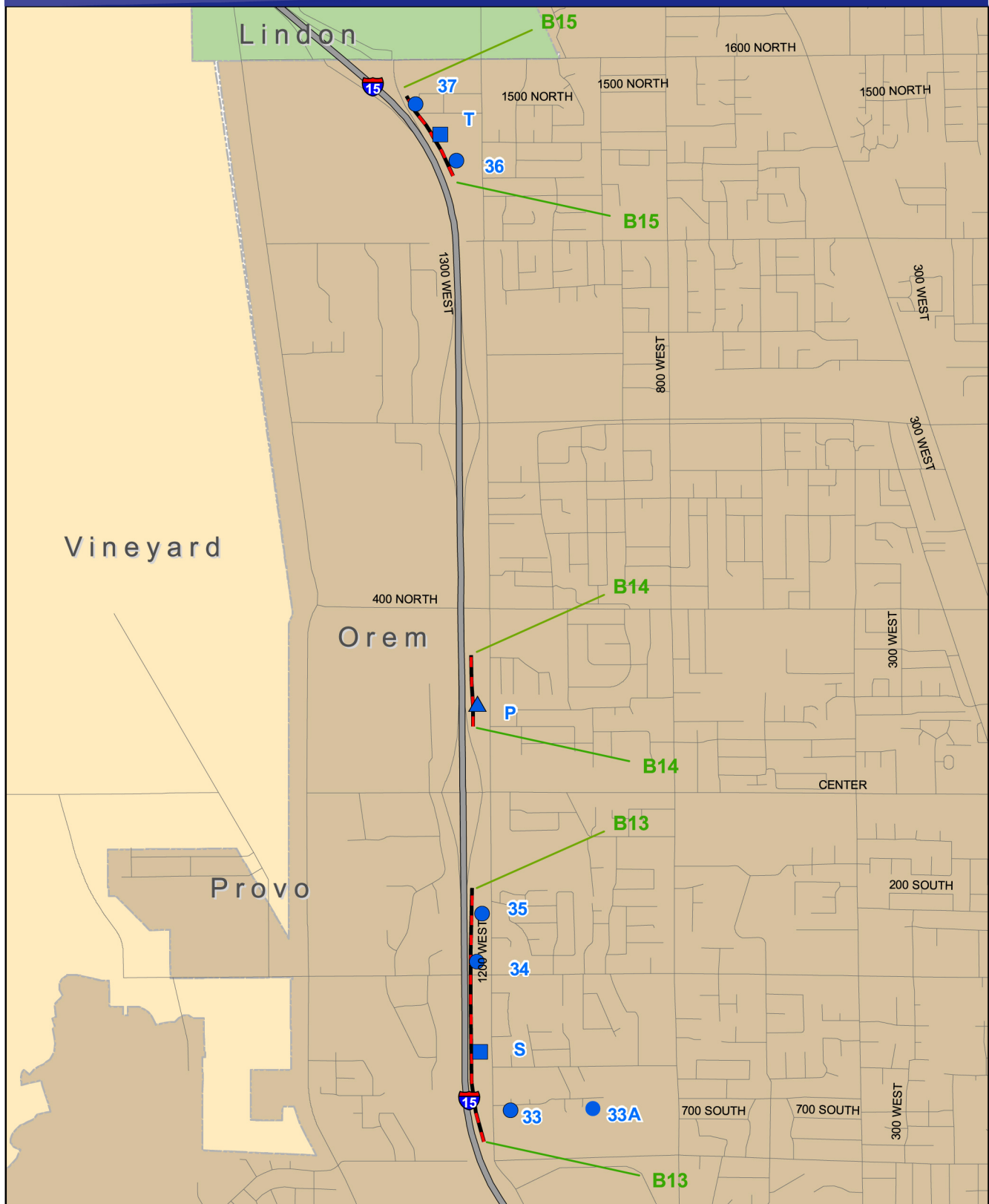


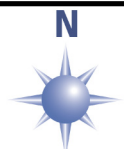
Figure 3.7-4
Receivers and Proposed Noise Barriers

LEGEND

	City Boundary
	Proposed Noise Barrier
	Proposed Noise Barrier Number
	24-Hour Measurement
	Short-Term Measurement
	Modeled Site



Basemap Sources: Salt Lake County, Utah County, and Utah's Statewide Geographic Information Database (SGID)



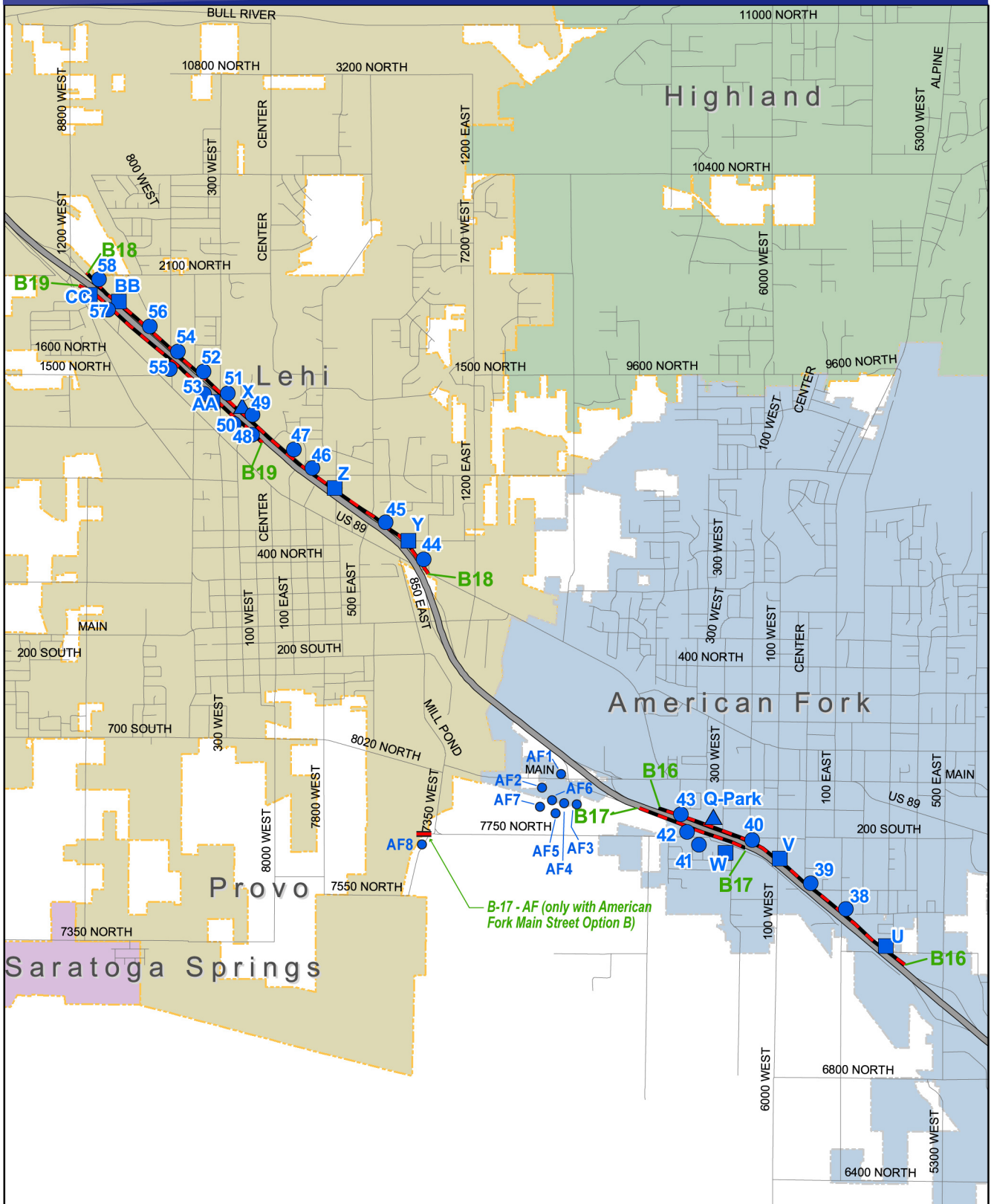
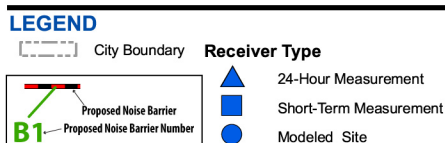
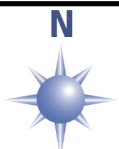


Figure 3.7-5
Receivers and Proposed Noise Barriers



A scale bar labeled "Miles" with markings for 0 and 0.5.

Basemap Sources: Salt Lake County, Utah County, and Utah's Statewide Geographic Information Database (SGID)



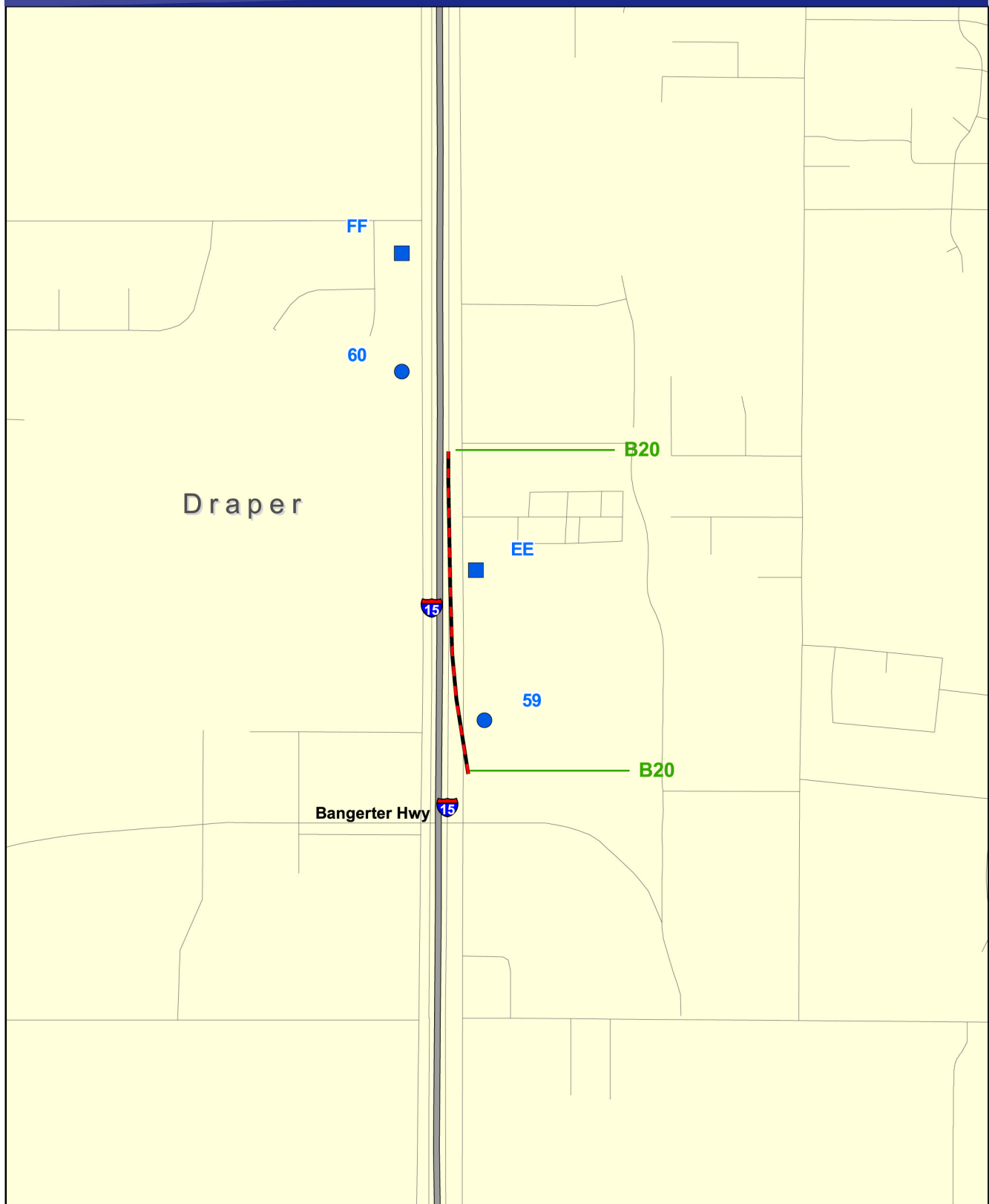


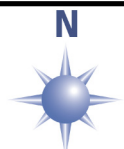
Figure 3.7-6
Receivers and Proposed Noise Barriers

LEGEND

	City Boundary
	Proposed Noise Barrier
	Proposed Noise Barrier Number
	24-Hour Measurement
	Short-Term Measurement
	Modeled Site



Basemap Sources: Salt Lake County, Utah County, and Utah's Statewide Geographic Information Database (SGID)



3.7.3 *Impacts of Alternatives*

This section presents the potential traffic noise levels in 2030 for Alternative 1 and Alternative 4. The peak-hour noise levels for the two alternatives are compared with the existing peak-hour levels that are described in Section 3.7.2. The projected levels are then evaluated with regard to the UDOT Noise Abatement Criteria (NAC). Noise abatement measures for the locations where the projected levels reach or exceed the NAC are described in Section 3.7.4.

For federally funded highway projects, noise impacts are defined under the Procedures for Abatement of Highway Traffic Noise and Construction Noise (23 CFR 772). UDOT has adopted FHWA guidelines and has developed specific noise standards that are found in its Noise Abatement Policy, 08A2-1, updated January 31, 2008. UDOT's highway traffic noise prediction requirements, noise analysis, and noise abatement criteria are consistent with Utah Code 72-6-111 and 112. Noise abatement measures have been considered as part of the alternatives in accordance with UDOT policy, which has been approved by the FHWA.

3.7.3.1 Analysis Methodology

FHWA's Traffic Noise Model (TNM) Version 2.5 computer model (FHWA, 2003) was used to predict Leq (h) traffic noise levels. Noise levels from free-flowing traffic depend on the following factors: (1) the number of automobiles, medium trucks, and heavy trucks per hour; (2) vehicular speed; and (3) reference noise levels of an individual vehicle. TNM also considers the effects of intervening barriers, topography, trees, and atmospheric absorption. Noise from sources other than traffic is not included. Therefore, when non-traffic noise, such as aircraft, is considerable in an area, TNM will under-predict the actual noise level. Noise monitoring results are used to calibrate the baseline conditions noise model.

An electronic file of the Alternative 4 conceptual design, which is shown in Volume II of this EIS, was imported into the TNM package. Major roadways, topographical features, building rows, and sensitive receivers were digitized into the model. Traffic volumes were based on Level of Service C traffic volumes, except on roadways where Level of Service C was not reached by 2030. On roadways with traffic volumes below Level of Service C, traffic volumes are based on the travel forecasting model output described in Chapters 1 and 2 of this EIS. Traffic mix is based on traffic counts taken during field noise measurements in November 2005. Noise measurements in the American Fork Main Street area were taken in October of 2007.

As described in Section 3.7.2, ambient noise levels were measured to describe the existing noise environment, identify major noise sources in the project area, and calibrate the noise model. The noise measurement and modeling locations are shown on Figures 3.7-1 through 3.7-6. Measurement locations are representative of a variety of noise conditions and of other sensitive receivers near the proposed project.

Thirty-five measured sites, which represent approximately 910 residences, were chosen as representative of noise-sensitive locations. One measurement site is used to represent all sensitive receivers in the area that have similar noise exposure to the I-15. For noise model calibration, traffic volumes in the noise model were adjusted to match traffic field counts, then the model was run and the results were compared with measured noise levels. Adjustment factors were applied to TNM to ensure that model results were within 2 dBA of the measured noise levels at the 35 measurement sites. This process ensures that the TNM noise model accurately predicts noise impacts of the project alternatives. The validated models were then run with the existing peak hour traffic volumes, described in Chapters 1 and 2 of this EIS, to calculate the modeled peak hour noise level. At 28 of the sites the modeled peak hour noise levels were within five dBA of the adjusted peak hour noise level. At receiver sites I, J, H and K the TNM modeled noise levels are six to 13 dBA higher than the adjusted peak hour noise levels. The lower measured noise levels at these sites are due to traffic volumes during the measurements being lower than the existing peak hour traffic volumes described in Chapters 1 and 2.

Predicted noise levels were compared to the UDOT Noise Policy, which defines a noise impact as 66 dBA (within 1 dBA of the FHWA NAC of 67 dBA). The numbers of affected receivers were counted for the build alternatives.

Mitigation measures were evaluated using UDOT's reasonableness and effectiveness criteria along with engineering feasibility at receivers where noise levels are modeled to reach or exceed the NAC's and UDOT's noise policy impact level.

Construction noise was qualitatively assessed using EPA reference levels.

Tables 3.7-4 through 3.7-7 show the predicted traffic noise levels from I-15 for the existing conditions, Alternative 1 and Alternative 4. The individual properties that are impacted are illustrated in Volume II of this EIS.

A traffic noise impact occurs when the design year (2030) noise levels reach or exceed the NAC for sensitive noise receivers. Table 3.7-2 lists the UDOT Noise Abatement Criteria. Most of the project corridor is considered Activity Category B. There are no Activity Category A receivers in the project study area. Therefore, if Alternatives 1 and 2 generate a noise level of 66 dBA or greater at a sensitive receiver, or if there is an increase of 10 dBA or more between the existing noise level and the design year (2030), a noise impact occurs.

3.7.3.2 South Utah County Noise Impacts

Table 3.7-4 shows the future peak-hour noise levels of Alternatives 1 and 4 compared with existing noise levels. The number of dwelling units represented by each receiver is also shown.

Alternative 1 peak hour noise levels will increase over the existing peak hour levels by two to five dBA. The NAC (66 dBA) will be reached or exceeded at 22 of the 23 receivers, representing 164 dwelling units. I-15 would not be reconstructed or widened under Alternative 1. Therefore no noise mitigation will be provided.

Alternative 4 peak hour traffic noise levels will increase by three to seven dBA over the existing levels and by one to four dBA over the Alternative 1 levels. The NAC (66 dBA) will be reached or exceeded at all 23 receivers, representing 169 dwelling units. Noise abatement for these impacts is discussed in Section 3.7.4 of this EIS.

**Table 3.7-4: Predicted Alternative 1 and Alternative 4 Noise Levels
South Utah County Section**

Note: Levels listed in bold indicate noise impacts as defined in UDOT's Noise Abatement Policy

Receiver	Number of Dwelling Units	Existing Modeled Peak Hour Noise Level	Alternative 1 Peak Hour Noise Level	Alternative 4 Peak Hour Noise Level
1	10	70	72	76
B	12	69	72	75
2	6	70	73	77
3	11	68	71	74
4	9	66	68	71
5	12	66	69	72
6	7	63	67	69
7	6	66	69	72
A	7	63	68	69
8	4	65	68	71
9	10	64	68	70
D	10	70	72	75

**Table 3.7-4: Predicted Alternative 1 and Alternative 4 Noise Levels
South Utah County Section – continued**

Note: Levels listed in bold indicate noise impacts as defined in UDOT's Noise Abatement Policy

Receiver	Number of Dwelling Units	Existing Modeled Peak Hour Noise Level	Alternative 1 Peak Hour Noise Level	Alternative 4 Peak Hour Noise Level
10	10	62	66	68
11	8	72	75	78
E	1	70	73	76
12	3	65	67	70
F	1	66	69	71
G	8	65	67	72
13	5	62	64	67
14	5	74	76	79
C	10	74	76	79
15	10	73	75	76
16	4	65	67	68

See Figures 3.7-1 to 3.7-6 for receiver locations

3.7.3.3 Central Utah County Noise Impacts

Table 3.7-5 shows the future peak-hour noise impacts of Alternatives 1 and 4. This section of the I-15 project includes options through Provo and Orem.

**Table 3.7-5: Predicted Alternative 1 and Alternative 4 Noise Levels
Central Utah County Section**

Note: Levels listed in bold indicate noise impacts as defined in UDOT's Noise Abatement Policy

Receiver	Number of Dwelling Units	Existing Modeled Peak Hour Noise Level	Alternative 1 Peak Hour Noise Level	Alternative 4 Options A and B Peak Hour Noise Level	Alternative 4 Options C and D Peak Hour Noise Level
I	12	64	65	80	80
17	10	64	66	77	77
18	6	66	67	81	81
19	7	63	64	75	75
20	7	63	64	72	72
21	7	64	66	75	75
22	7	63	64	74	74

Table 3.7-5: Predicted Alternative 1 and Alternative 4 Noise Levels
Central Utah County Section – continued

Note: Levels listed in bold indicate noise impacts as defined in UDOT's Noise Abatement Policy

Receiver	Number of Dwelling Units	Existing Modeled Peak Hour Noise Level	Alternative 1 Peak Hour Noise Level	Alternative 4 Options A and B Peak Hour Noise Level	Alternative 4 Options C and D Peak Hour Noise Level
J	9	63	65	73	73
H	10	76	79	79	79
23	10	62	63	73	73
24	7	62	63	74	74
25	8	62	64	73	73
26	12	64	65	75	75
27	8	63	64	73	73
28	14	65	66	77	77
K	15	63	64	73	73
29	11	63	64	73	73
30	12	64	65	75	75
L	29	64	66	76	76
M	22	68	71	73	73
31	5	67	71	70	70
N	14	65	65	68	65
32	13	74	77	77	75
O	6	78	80	82	82
R	4	65	68	69	69
33	8	64	66	67	67
33A	8	53	56	59	58
S	10	74	76	78	78
34	11	75	77	79	79
35	10	72	73	76	76
P	18	74	76	79	79
36	32	66	68	69	69
T	32	68	71	72	72
37	64	75	77	79	79

See Figures 3.7-1 to 3.7-6 for receiver locations

The Alternative 1 2030 peak noise hour levels will increase over the existing levels by 0 to four dBA. The NAC (66 dBA) will be reached or exceeded at 19 of the 34 receivers, representing 311 dwelling units. Noise abatement will not be considered for Alternative 1 because no changes are proposed for I-15.

Options A, B, C and D in Alternative 4 will result in 2030 peak noise hour level increases of 0 to 16 dBA over the existing levels and by 0 to 15 dBA over the Alternative 1 2030 peak noise hour levels. At Receivers N and 32, the four options move the centerline of I-15 further away. Options A and B add frontage roads in this area. With the frontage roads, the traffic noise levels at Receiver N and 32 at peak hour traffic volumes are 0 to 3 dBA higher than Alternative 1 levels. Options C and D do not include the frontage roads. Without frontage roads, the traffic noise levels at Receiver N is the same as Alternative 1, and at Site 32 the noise level is 2 dBA lower than Alternative 1.

The increase in noise level by 10 dBA or more at Receivers I, J, K and L, and at 17 through 20, is the result of the removal of existing sound walls to allow for the widening and reconstruction of I-15. The existing noise walls would be reconstructed. The NAC (66 dBA) will be reached or exceeded at 33 of 34 receivers, representing 405 dwelling units, with Option A and B. If Options C and D are built the NAC (66 dBA) will be reached or exceeded at 32 of the 34 receivers, representing 436 dwelling units. Noise abatement is considered for all options in Alternative 4 and is presented in Section 3.7.4.

The Preferred Alternative includes Option D in this area, which has been refined to include the 820 North re-alignment. Receiver 31 is the closest receiver to the proposed re-alignment. The analysis shows a predicted noise level of 70 dBA, one dBA less than Alternative 1.

3.7.3.4 North Utah County Noise Impacts

Table 3.7-6 shows the impact of Alternatives 1 and 4 on identified receivers. Alternative 1 peak hour noise level will increase over the existing levels by two to four dBA. The NAC (66 dBA) will be reached or exceeded at 29 of the 39 receivers, representing 229 dwelling units. Noise abatement will not be considered for the No Build Alternative because no changes are proposed for I-15.

Alternative 4 has three options for the interchange at American Fork Main Street. Alternative 4 with American Fork Main Street Option A will result in an increase in peak hour traffic noise levels by three to nine dBA over the existing levels and by 0 to 7 dBA over the Alternative 1 levels. The NAC (66 dBA) will be reached or exceeded at 31 of 39 receivers, representing 243 dwelling units. Alternative 4 with American Fork Main Street Option B will result in an increase in peak hour traffic noise levels by up to 25 dBA over the existing levels and by 0 to 23 dBA over the Alternative 1 levels. The NAC (66 dBA) will be reached or exceeded at 36 of 39 receivers, representing 263 dwelling units. Alternative 4 with American Fork Main Street Option C will result in an increase in peak hour traffic noise levels three to nine dBA over the existing levels and by 0 to seven dBA over the Alternative 1 levels. The NAC (66 dBA) will be reached or exceeded at 30 of 39 receivers, representing 242 dwelling units. Noise abatement is considered for this section and is presented in Section 3.7.4.

**Table 3.7-6: Predicted Alternative 1 and Alternative 4 Noise Levels
North Utah County Section**

Note: Levels listed in bold indicate noise impacts as defined in UDOT's Noise Abatement Policy

Receiver	Number of Dwelling Units	Existing Modeled Peak Hour Noise Level	Alternative 1 Peak Hour Noise Level	Alternative 4 AF Main Street Option A Peak Hour Noise Level	Alternative 4 AF Main Street Option B Peak Hour Noise Level	Alternative 4 AF Main Street Option C Peak Hour Noise Level
U	14	75	77	79	79	79
38	9	70	72	73	73	73
39	12	76	78	82	82	82
V	10	77	79	83	83	83
40	9	74	76	79	79	79
W	10	63	65	67	67	67

**Table 3.7-6: Predicted Alternative 1 and Alternative 4 Noise Levels
North Utah County Section – continued**

Note: Levels listed in bold indicate noise impacts as defined in UDOT's Noise Abatement Policy

Receiver	Number of Dwelling Units	Existing Modeled Peak Hour Noise Level	Alternative 1 Peak Hour Noise Level	Alternative 4 AF Main Street Option A Peak Hour Noise Level	Alternative 4 AF Main Street Option B Peak Hour Noise Level	Alternative 4 AF Main Street Option C Peak Hour Noise Level
Q	8	68	70	71	71	71
41	12	66	68	69	69	69
42	5	69	71	73	73	73
43	13	74	76	78	78	78
AF-1	1	66	66	73	66	65
AF-2	1	56	57	63	59	63
AF-3	1	59	59	60	Demolished by Option B. Is within proposed ROW.	62
AF-4	2	55	55	58	69	59
AF-5	1	56	57	59	69	60
AF-6	1	55	55	57	70	58
AF-7	1	55	55	57	71	57
AF-8	15	46	48	53	71	53
44	7	65	68	65	65	65
Y	7	68	71	70	70	70
45	8	74	77	78	78	78
Z	10	71	74	76	76	76
46	6	67	70	72	72	72
47	7	67	70	71	71	71
48	15	72	75	77	77	77
49	3	75	79	77	77	77
50	10	68	72	73	73	73
51	4	67	70	71	71	71
X	7	68	71	72	72	72
AA	9	63	66	72	72	72
52	3	67	71	76	76	76

**Table 3.7-6: Predicted Alternative 1 and Alternative 4 Noise Levels
North Utah County Section – continued**

Note: Levels listed in bold indicate noise impacts as defined in UDOT's Noise Abatement Policy

Receiver	Number of Dwelling Units	Existing Modeled Peak Hour Noise Level	Alternative 1 Peak Hour Noise Level	Alternative 4 AF Main Street Option A Peak Hour Noise Level	Alternative 4 AF Main Street Option B Peak Hour Noise Level	Alternative 4 AF Main Street Option C Peak Hour Noise Level
53	6	61	65	72	72	72
54	8	69	73	76	76	76
55	5	61	64	68	68	68
56	5	72	76	77	77	77
BB	11	73	76	80	80	80
57	3	71	74	74	74	74
CC	5	70	74	74	74	74
58	6	68	71	72	72	72

See Figures 3.7-1 to 3.7-6 for receiver locations

3.7.3.5 South Salt Lake County Noise Impacts

Table 3.7-7 shows the impact of Alternatives 1 and 4 on identified receivers.

Alternative 1 will increase noise over the existing peak hour traffic noise levels by one to two dBA. The NAC (66 dBA) will be reached or exceeded at all four receivers, representing 49 dwelling units. Noise mitigation will not be considered because no changes to I-15 are being considered.

The Alternative 4 peak hour traffic noise levels will increase by two to four dBA over the existing levels and will increase by 0 to two dBA over the No Build levels. The NAC (66 dBA) will be reached or exceeded at all four receivers, representing 49 dwelling units. Noise abatement is considered in this geographic section and is presented in Section 3.7.4.

**Table 3.7-7: Predicted Alternative 1 and Alternative 4 Noise Levels
South Salt Lake County Section**

Note: Levels listed in bold indicate noise impacts as defined in UDOT's Noise Abatement Policy

Receiver	Number of Dwelling Units	Existing Modeled Peak Hour Noise Level	Alternative 1 Peak Hour Noise Level	Alternative 4 Peak Hour Noise Level
59	4	72	74	74
EE	32	73	75	75
60	6	72	74	76
FF	7	74	75	76

See Figures 3.7-1 to 3.7-6 for receiver locations

3.7.4 Noise Mitigation

When a noise impact is identified, FHWA and UDOT specify that noise abatement must be considered and if found to be feasible, and reasonable, would be incorporated into the project design after balloting results indicate a desire for noise abatement. When determining the feasibility and reasonableness of noise abatement, UDOT's Noise Abatement Policy must be followed. Based on the current design there are reasonable and feasible noise abatement measures that reduce traffic noise levels at many of the impacted receivers.

In accordance with FHWA guidelines, several noise abatement measures were considered to reduce highway generated noise impacts. These measures included traffic management strategies, alteration of horizontal and vertical alignments, creation of buffer zones, acquisition of property rights for construction of noise barriers, sound insulation for public institutions and construction of noise barriers or berms within the I-15 right-of-way.

These mitigation measures were evaluated for their potential to reduce noise impacts from the proposed action. The results of the evaluation are summarized below.

Traffic Management Measures

Management measures could include restricting the times of day when travel is permitted, restrictions on truck traffic, modified speed limits, and exclusive land designations. As I-15 is an interstate freeway, a NAFTA and a CANAMEX corridor, restriction of travel times and restrictions on traffic are not consistent with its role in the regional and national transportation system. Traffic management measures are therefore not feasible as a noise mitigation measure.

Land Use Controls

As stated in the FHWA "Highway Traffic Noise Analysis and Abatement Policy and Guidance (1995)", "The Federal Government has essentially no authority to regulate land use planning or the land development process." UDOT also does not have authority over land use control and planning. Therefore, neither FHWA nor UDOT can implement noise attenuation through land use controls to mitigate for the noise impacts of Alternative 4.

Acquisition of Property to Serve as a Buffer Zone

The FHWA "Highway Traffic Noise Analysis and Abatement Policy and Guidance (1995)" states that:

"The potential use of buffer zones applies to predominantly unimproved property. This authority is not used to purchase homes or developed property to create a noise buffer zone. It is used to purchase unimproved property to preclude future noise impacts where development has not yet occurred."

There is little undeveloped property along the I-15 corridor that would afford this opportunity. As shown in the aerial photography mapping contained in Volume II of this EIS, the majority of property adjacent to I-15 is developed. Acquisition of this predominately developed property to serve as a buffer zone for the I-15 interstate would not comply with FHWA guidance.

Alteration of Roadway Horizontal and/or Vertical Alignment

Development of Alternative 4 was an iterative process that resulted in minor changes to the I-15 alignment to avoid or minimize impacts to wetlands, cultural resources, and Section 4(f) resources; to accommodate interchanges with cross streets; and to minimize relocations of dwelling units and businesses. Additional changes to the I-15 horizontal alignment would not be a feasible noise mitigation measure as it would likely result in impacts to those resources that the current Alternative 4 conceptual engineering avoids or minimizes impacts to. Changes of the vertical alignment, such as depressing the roadway, would not be reasonable. Based on the conceptual engineering shown in Volume II, lowering the roadway would widen the footprint, resulting in additional direct impacts to adjacent properties, additional relocations of dwelling units and businesses, and additional impacts to wetlands and cultural resources.

Insulation of Public Use, Nonprofit Institutional Buildings

The receivers that would be impacted are not public use, nonprofit institutions and therefore would not be eligible for acoustic insulation.

Noise Barriers

Noise barriers include noise walls and berms. The effectiveness of a noise barrier is determined by its height and length and by the topography of the project site. To be effective, the barrier must block the "line of sight" between the highest point of a noise source, such as a truck's exhaust stack, and the highest part of a receiver. It must be long enough to prevent sounds from passing around the ends, have no openings such as driveway connections, and be dense enough so that noise will not be transmitted through it. Intervening rows of buildings that are not noise sensitive also could be used as barriers.

UDOT Noise Policy defines a feasible noise barrier as one that provides a noise reduction of at least five dBA to at least 75% of front-row (adjacent) receivers.

For a noise barrier to be reasonable under UDOT noise policy the maximum cost must not exceed \$30,000 per benefited receiver. A benefited receiver is any impacted or non-impacted receiver that gets a noise reduction of five dBA or more as a result of the noise barrier.

The noise study also assumes that engineering feasibility could be maintained without unforeseen circumstances, such as dealing with utilities, water crossing requirements, drainage, the ability to stay outside the clear zone, and staying within the proposed ROW.

Noise Mitigation during Construction Activities

Construction activities would generate noise during the construction period and would impact the receptors described in Section 3.7. To reduce construction noise at nearby receptors, the following mitigation measures would be incorporated into construction plans and contractor specifications:

- Equipping construction equipment engines with mufflers, intake silencers, and engine enclosures.
- Turning off construction equipment during prolonged periods of nonuse to eliminate noise from construction equipment during those periods.

During the design/construction phase, UDOT will work with the affected cities to establish appropriate limitations that balance construction schedule and construction noise.

3.7.4.1 Proposed Noise Abatement

The form of noise abatement considered in this EIS is noise barriers. UDOT is committed to providing reasonable and feasible noise abatement measures for highway-related traffic noise. These measures include the reasonable and feasible methods for reducing traffic noise levels at receivers in accordance with UDOT's Noise Abatement Policy, and are based on the preliminary design of the Preferred Build Alternative. The final decision on the use of noise abatement measures will be made upon completion of project design and after an opportunity for public involvement and approval at the local, state, and federal levels.

The likely locations of noise barriers are shown on Figures 3.7-1 through 3.7-6. The proposed placement of all barriers is at the edge of shoulder of I-15 of Alternative 4, unless otherwise noted. Barriers are numbered sequentially from south to north and are preceded by the letter "B". The likely location of barriers are also shown on the conceptual design drawings in Volume II of this EIS. The impacted receivers are marked with a green dot on the Volume II drawings.

Tables 3.7-8 to 3.7-11 show the noise abatement measures that have been found to be reasonable and feasible at this stage of design. Each noise barrier is cross-referenced in the tables to the appropriate conceptual design sheets found in Volume II of this EIS.

UDOT's Noise Abatement Policy requires public and local government acceptance of each proposed noise barrier. Noise barriers will be further assessed during the design stage prior to construction. UDOT will contact the local municipality and impacted residents/landowners on both sides of the highway. If a sufficient number of affected residents/land-owners, as defined by the noise policy, vote in favor of noise walls they will be installed.

3.7.4.2 South Utah County

Six noise barriers were modeled in South Utah County. Table 3.7-8 shows the details of these barriers. Only barriers B1, B2 and B6 were found to be both feasible and reasonable.

- B1 was modeled to provide noise abatement to receivers 1, B, 2, 3, 4, 5, 7, 8, D and 11. The noise barrier was found to be both feasible and reasonable.
- B 2 was modeled to provide noise abatement to receivers 6, A, 9 and 10. The noise barrier was found to be both feasible and reasonable.
- B3 was modeled to provide noise abatement to receiver E. The noise barrier was found to be feasible and provided seven dBA of noise reduction at eight feet, but the barrier is not reasonable, since it shields one residence at a cost of \$117,916.
- B4 was modeled to provide noise abatement to receivers 12 and F. The noise barrier was found to be feasible and provided six dBA of noise reduction at 12 feet, but the barrier is not reasonable, since it shields three residences at a cost of \$203,400 per residence.
- B5 was modeled to provide noise abatement to receivers G and 13. The noise barrier was found to be feasible and provided five dBA of noise reduction at 10 feet, but the barrier is not reasonable, since it shields 13 residences at a cost of \$32,300 per residence.
- B6 was modeled to provide noise abatement to receivers 14, C, 15 and 16. The noise barrier was found to be both feasible and reasonable.

Table 3.7-8: South Utah County Noise Barriers

Barrier	Start/End Station # Volume II Sheet #	Receivers Benefited	Barrier Data			Effectiveness and Cost Data				
			Length	Height	Area [^]	Sensitive Receivers		Noise Reduction	Total Cost	Cost per Benefited Receiver*
						Number Impacted	Number Impacted			
B1 Northbound	477+ 00/ 557+ 00 Sheets 14 to 17	1, B, 2, 3, 4, 5, 7, 8, D and 11	8080	12 ft	96,965 Sq	83	83	6 to 11 dBA	\$1,939,298	\$23,400
B2 Southbound	557+ 00/ 520+ 00 Sheets 17, 16	6, A, 9, and 10	3585	12 ft	43,026 Sq	35	35	6 to 8 dBA	\$860,516	\$24,600
B6 Northbound	856+ 00/ 895+ 00 Sheets 27, 28	14, C, 15, 16	3844	8 FT ¹	30,750 Sq	29	29	5 to 7 dBA	\$615,000	\$24,600

[^] Square foot calculation as generated from TNM

*Costs are rounded and based on \$20 per square foot.

¹ This 8-foot wall is adequate to achieve a five dBA reduction at Sites 4A and SU15. A higher wall would not be reasonable due to cost

3.7.4.3 Central Utah County

Eight noise barriers were modeled in the Central Utah County section. Table 3.7-9 shows the details of these barriers. B7, B8, B13, B14, and B15 were found to be both feasible and reasonable. B11 was found to provide noise abatement for a severely impacted area.

- B7 was modeled to provide noise abatement to receivers I, 17, 18, 19, 20, J, 24, 25, 27, 28 and K. The noise barrier was found to be both feasible and reasonable. The barrier replaces an existing noise barrier that was in the proposed ROW.
- B8 was modeled to provide noise abatement to receivers 21, 22, H, 23 and 26. The noise barrier was found to be both feasible and reasonable.
- B9 was modeled to provide noise abatement to receivers 29, 30, L, M, 31. The noise barrier was found to be both feasible and reasonable. The barrier replaces an existing barrier and will match to the existing barrier at the southern end point.
- B10 was modeled to provide noise abatement to receivers N, 32. The noise barrier was found to be feasible and reasonable. The barrier would be placed on the new Alternative 4 right-of-way line beginning at STA 1410+00 and ending at STA 1430+00
- B11 was modeled to provide noise abatement to receiver O. Since receiver O predicted noise level is above 80 dBA, the noise barrier cost per residence is not limited by the reasonable allowance. An eight-foot barrier would provide six dBA of noise abatement and cost \$46,900 per residence for six buildings.
- B12 was modeled to provide noise abatement to receiver R. The noise barrier was found to not provide at least five dBA reduction at wall heights from eight to 18 feet and therefore, deemed to be unfeasible.
- B13 was modeled to provide noise abatement to receivers 33, 33A, S, 34, 35. The noise barrier was found to be both feasible and reasonable.
- B14 was modeled to provide noise abatement to receiver P. The noise barrier was found to be both feasible and reasonable.
- B15 was modeled to provide noise abatement to receiver 36, T and 37. The noise barrier was found to be both feasible and reasonable. B15 is located on the new Alternative 4 right-of-way.

The impact of the frontage roads in the Provo/Orem Options A and B on noise and the need for noise barriers was analyzed using the TNM model. This analysis used the predicted 2030 hourly volume on the frontage roads and the 40 to 45 mile per hour design speed. The results showed that the noise levels generated by the frontage roads in Options A and B would increase the noise level by 2 to 3 dBA. This additional frontage road noise level in combination with the I-15 mainline noise levels does not change the need for or location of noise barriers for this section of I-15.

All Options A, B, C, and D would require the noise barriers described in Table 3.7-9.

Table 3.7-9: Central Utah County Noise Barriers

Barrier	Start/End Station # Volume II Sheet #	Receivers Benefited	Barrier Data			Effectiveness and Cost Data				
			Length	Height	Area [^]	Sensitive Receivers		Noise Reduction	Total Cost	Cost per Benefited Receiver*
						Number Impacted	Number Benefited			
B7 Southbound	1345+ 00/1237+ 00 Sheets 41-45	I, 17, 18, 19, 20, J, 24, 25 27, 28 and K	10,954	12 ft	131,447 Sq	110	110	5 to 12 dBA	\$2,628,942	\$23,900
B8 Northbound	1266+ 00/1316+ 00 Sheets 42-44	21, 22 H, 23 and 26	4601	12 ft	55,218 Sq	46	46	7 to 11 dBA	\$1,104,356	\$24,000
B9 Southbound	1395+ 00/1354+ 00 Sheets 45, 46	29, 30 L, M and 31	4247	16 ft	67,945	68	65	2 to 11 dBA	\$1,358,910	\$21,500
B10 Northbound	1410+ 00/1430+ 00 Sheets 48, 49	N, 32	2086	14 ft	29,207	27	24	2 to 6 dBA	\$584,142	\$24,339
B11 Northbound	1430+ 00/1477+ 00 Sheets 48, 49	O	1758	8 ft	14,066	6	6	6 dBA	\$281,312	\$46,900
B13 Northbound	1559+ 00/1600+ 00 Sheets 52-54	33, 33A, S 34, and 35	3695	12 ft	44,334	39	39	5 to 10 dBA	\$886,725	\$22,750
B14 Northbound	1620+ 00/1630+ 00 Sheets 54, 55	P	1034	16 ft	16541	18	18	11 dBA	\$330,814	\$18,400
B15 Northbound	1700+ 00/1713+ 00 Sheet 57	36, T, 37	1404	16 ft	22466	128	128	5 to 7 dBA	\$449,318	3,500

[^] Square foot calculation as generated from TNM
*Cost are rounded and based on \$20 per square foot.

3.7.4.4 North Utah County

The five noise barriers shown in Table 3.7-10 and described below were modeled in the North Utah County section to address noise abatement for sensitive receivers and all were found to be feasible and reasonable.

- B16 was modeled to provide noise abatement to receivers U, 38, 39, V, 40, Q, and 43. The noise barrier was found to be both feasible and reasonable.
- B17 was modeled to provide noise abatement to receivers W, 41 and 42. The noise barrier was found to be both feasible and reasonable.
- B17-AF was modeled to provide noise abatement to receiver AF-8 for American Fork Main Street Option B. The noise barrier was found to be both feasible and reasonable. Barrier AF-1 starts on the edge of shoulder of the eastbound side of the new roadway at the intersection with 7350 West and ends 956 feet to the west.
- B18 was modeled to provide noise abatement to receivers 44, Y, 45, Z, 46, 47, 49, X, 51, 52, 54, 56, BB, and 58. The noise barrier was found to be both feasible and reasonable.
- B19 was modeled to provide noise abatement to receivers 48, 50, AA, 53, 55, 57 and CC. The noise barrier was found to be both feasible and reasonable.

Two other noise barriers were evaluated in the American Fork Main Street area. A noise barrier to provide noise abatement for receiver AF-1 with American Fork Main Street Option A is not feasible because this portion of the new roadway is not access controlled. A noise barrier would block access to adjacent properties. For the same reason, a noise barrier for receivers AF-4 to AF-7 for American Fork Main Street Option B is not feasible.

3.7.4.5 South Salt Lake County

Two noise barriers were modeled in the South Salt Lake County section. B20 was found to be feasible and reasonable.

- B20 was modeled to provide noise abatement to receivers 59 and EE. The noise barrier was found to be both feasible and reasonable. The proposed barrier would start on the EOS of the NB on-ramp from Bangerter Highway, run along the On-ramp EOS and transition to the Main Line EOS.
- B21 was modeled to provide noise abatement to receivers 60 and FF. The noise barrier was found to provide at least five dBA of noise reduction at 12 feet, but the cost per residences is \$35,370, which is above UDOT's reasonable cost of \$30,000.

3.7.5 Indirect Impacts

No indirect impacts from noise were identified.

Table 3.7-10: North Utah County Noise Barriers – Northbound

Barrier	Start/End Station # Volume II Sheet #	Receivers Benefited	Barrier Data			Effectiveness and Cost Data				
			Length	Height	Area [^]	Sensitive Receivers		Noise Reduction	Total Cost	Cost per Benefited Receiver*
						Number Impacted	Number Benefited			
B16 Northbound	1931 + 00/ 2010+ 00 Sheets 67-70	U, 38, 39, V, 40, Q, 43	7830	12 ft	93965	76	76	5 to 13 dBA	\$1879,306	\$24,800
B17 Southbound	2004+ 00/ 1983+ 00 Sheet 69	W, 41, 42	3695	12 ft	44,334	39	39	5 to 10 dBA	\$886,725	\$22,750
B17-AF Main Street Eastbound AF Main Street Option B only	B57 + 00 to B67 + 00 Sheet 70.3B	AF-8	956	18 feet	17,214	15	15	11 to 14 dBA	\$342,274	\$22,818
B18 Northbound	2101 + 00/ 2220+ 00 Sheets 74-78	44, Y, 45 Z, 46, 47 49, X, 51, 52, 54, 56 BB and 58	12087	10 ft	120,872	104	104	5 to 12 dBA	\$2,417,439	\$23,250
B19 Southbound	2220+ 00/ 2156+ 00 Sheets 76-78	48, 50, AA, 53 55, 57 and CC	6400	8 ft	51,204 Sq	46	42	5 to 7 dBA	\$1,024,075	\$24,400

[^] Square foot calculation as generated from TNM

*Cost are rounded and based on \$20 per square foot